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Physical Activity in Early Adolescent Girls:

An Examination of Biological, Affective, Interpersonal and Sociocultural Influences

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Physical Activity in Early Adolescent Girls:

An Examination of Biological, Affective, Interpersonal and Sociocultural Influences

by

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Dedication

I would like to dedicate this work first and foremost to my grandparents, who were there for the start of my work, but did not live to see its finish—Israel Brian Taylor, Esmè Taylor, and Alvin Standiford. I will always remember your strength, your beauty, your support, and your love. I would also like to dedicate this work to my mother and father, Arleen and Daniel Standiford, who have been a constant source of inspiration and encouragement. I would like to dedicate this work to Deanna Taylor, whose calm and levelheaded support and occasional tough-love motivational speeches certainly deserve mentioning. I would be remiss if I didn't mention my younger siblings—Jeremy, Julie, Nathan, Alec, Nicole and Sean, who grew up to become successful adults while I was working on my Ph.D. I follow your example as much is you follow mine. You make me want to be a better person.

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Physical Activity in Early Adolescent Girls:

An Examination of Biological, Affective, Interpersonal and Sociocultural Influences

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Pediatric overweight is defined as a body mass index (BMI) for age of 85th-95th percentile, and occurs in approximately 33.6% of adolescents 12-19 years of age. Hispanic adolescents are disproportionately at risk for overweight. Excess weight can predispose adolescents to develop diabetes mellitus type 2, coronary artery disease, hypertension, hypercholesterolemia, sleep apnea, osteoporosis, asthma, and certain types of cancer, whereas physical activity can help prevent and treat these diseases. Little is known about the factors that contribute to physical activity in Hispanic adolescent girls. The purpose of this study was to examine and compare the influence of personal characteristics, perceptual influences, interpersonal influences and sociocultural influences on physical activity in White and Hispanic adolescent girls. The theoretical framework for this study was self-designed—the Physical Activity Lifestyle Model.

Data for this cross-sectional study was collected from girls age 11-14 who presented to the Children's Wellness Center in Del Valle, TX (N = 121) in the summers of 2011 and 2012. Most participants self-identified as Hispanic (n = 106). Participants

completed a survey consisting of a 1-day physical activity recall, a demographic questionnaire, and several validated (primarily Likert-type) questionnaires. Height and weight were measured in the clinic. Data analysis began with descriptive analysis (mean, standard deviation and percentage) of demographic characteristics, dependent and independent variables, then Pearson correlations, and finally multiple linear regression to determine the influence of the independent variables on physical activity. No significant differences were found between ethnic groups on age, grade or school ($p > .05$). Physical activity was significantly related to body image ($r = .189, p < .05$), friend social support ($r = .279, p < .01$), and family social support ($r = .401, p < .01$). In addition, physical activity significantly predicted BMI percentile ($B = -.043$, $SE = .019$, $t = -2.249$, $p = .027$), appearance-related media messages ($B = .259$, $SE = .127$, $t = 2.038$, $p = .044$), pressures to be thin ($B = .311$, $SE = .149$, $t = 2.082$, $p = .040$), family social support for physical activity ($B = .089$, $SE = .042$, $t = 2.139$, $p = .035$), body image ($B = .367$, $SE = .123$, $t = 2.987$, $p = .004$), and physical activity enjoyment ($B = .083$, $SE = .040$, $t = 2.089$, $p = .040$).

When designing an intervention to promote physical activity, health care providers and educators should consider that multiple external factors influence physical activity participation in Hispanic adolescent girls. Healthcare providers should involve parents and siblings in physical activity interventions for overweight adolescent girls. Interventions should be tailored to work with the adolescent girls' physical and social environment. Public health nurses should work with schools and communities to increase physical activity opportunities for adolescent girls in physical education classes, girls' sports, and after-school programs.

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Chapter 1: Introduction

In this chapter I will discuss the growing epidemic of obesity among adolescent girls, focusing on an at-risk group: Hispanic adolescent girls. I will explain the importance of physical activity to prevent and treat obesity, and the long-term consequences of inactivity and obesity in adolescents. I will state the study's purpose and significance, then explain the theoretical model for the study, thereafter enumerating my research questions and hypotheses. Finally, I will list assumptions and limitations.

The Obesity Epidemic

The prevalence of obesity and overweight in the U.S. has reached epidemic proportions over the past 30 years (Crespo & Arbesman, 2003). In 2010, 35.5% of adult men and 35.8% of adult women in America were overweight or obese (Flegal, Carroll, Kit and Ogden, 2012). As adults became obese over the years, so did children.

Pediatric overweight is defined as a body mass index (BMI) for age of 85^{th}-95^{th} percentile, and occurs in approximately 33.6% of adolescents 12-19 years of age (Ogden, Carroll, Kit & Flegal, 2012). Pediatric obesity is defined as a BMI greater than 95^{th} percentile, and occurs in 18.4% of adolescents 12-19 years of age (Ogden et al., 2012). Overweight is more prevalent in adolescence than in childhood, which is particularly problematic since overweight adolescents are more likely to remain overweight as adults (Eisenman, Wickel, Welk & Blair, 2004). Overweight is also significantly more prevalent among Hispanic (OR = 1.64, 95% CI = 1.01-2.67, p = .04) and African American (OR = 2.89, 95% CI – 1.61–5.20, p = .0004) adolescent girls than among European American adolescent girls (Huh, Stice, Shaw & Boutelle, 2012; Rendall, Weden, Fernandes & Faynman, 2012). According to the most recent National Health and

Nutrition Examination Survey data (NHANES 2009-2010), 43.4% of Hispanic adolescents are either at risk for overweight or are overweight (Ogden, Carrol, Kit & Flegal, 2012). Furthermore, adolescent overweight increases significantly with acculturation—American-born Hispanic people are at greater risk for becoming overweight than those who are foreign-born Hispanic immigrants (Kershaw, Greenlund, Stamler, Shay & Daviglus, 2012; Singh, Kogan & Yu, 2009).

This higher prevalence of overweight in adolescence greatly increases the risk for developing metabolic syndrome, hyperlipidemia, hypertension, and fatty arterial plaques, called atherosclerosis (Maligie, Crume, Scherzinger, Stamm & Dabelea, 2012; Wake et al., 2010; Zhang & Rodriguez-Monguio, 2012). These conditions can predispose overweight adolescents for diabetes mellitus type 2, coronary artery disease, stroke, osteoporosis, heart attack, cancer, asthma, and congestive heart failure (Park, Falconer, Viner & Kinra, 2012; Reilly & Kelly, 2011; Tirosh et al., 2011). Overweight Hispanic Americans are also at higher risk for obesity-related diseases due to a higher rate of abdominal fat distribution, and a higher rate of metabolic syndrome than White Americans (Castillo et al., 2007; Daviglus et al., 2012; Maligie et al., 2012).

The onset of puberty increases the risk for overweight, obesity, diabetes mellitus type 2 and related diseases in female adolescents (Goran, Ball & Cruz, 2003; He, Zhang, Hunter, Hankinson, Louis, Hediger & Hu, 2009). Girls who go through puberty at an early age (before 12 years of age) are less likely to be physically active, more likely to be sedentary, and more likely to be overweight, and at greater risk for type 2 diabetes mellitus (Currie, Ahluwalia, Godeau, Gabhainn, Due & Currie, 2011; Thompson, Baxter-Jones, Mirwald & Bailey, 2003). Insulin resistance during puberty is more likely to

occur among females than males, and usually is most severe earlier in puberty (Davidson et al., 2007).

Physical Activity

Physical activity can prevent and, in many cases, reverse obesity and the diseases with which it is associated (Castelli, 1984; Lee, Artero, Sui & Blair, 2010). Adolescents who are physically active on a daily basis are less likely to be overweight, and are more physically and mentally healthy than those who are not regularly physically active (Kirk et al., 2005; Strohle et al., 2007; Ussher, Owen, Cook & Whincup, 2007). Over the past 20 years, adolescents have become less and less physically active (Caspersen, Pereira & Curran, 2000; Lowry et al., 2004; Shay, Daniels, Rooks, Gidding & Lloyd-Jones, 2013). One of the reasons for this decrease in physical activity is that there has been a significantly lower rate of participation in high school physical education (PE) since 1991, particularly among females (Lowry et al., 2004). Lowry, Lee, Fulton, Demissie, and Kann (2013) found that only 21.7% of males, and 8.4% of females, 17% of White, and 11.9% of Hispanic high school age adolescents reported engaging in daily physical activity. In addition, longitudinal research has revealed that physical activity decreases steadily over the adolescent years (Brodersen, Steptoe, Boniface, & Wardle, 2007; Caspersen et al., 2000; Duncan, Duncan, Strycker & Chaumeton, 2007; Lowry et al., 2013; Pate, Dowda, O'Neill & Ward, 2007). This decline in physical activity is much greater in girls (46% decline) than in boys (23% decline; Brodersen, Steptoe, Boniface, & Wardle, 2007). Minority adolescent females experience this age-related decline in physical activity more frequently than White adolescent females (Dumith, Gigante, Domingues & Kohl, 2011).

Sedentary Behavior

Sedentary behavior (lack of any physical activity) has increased over the years--adolescents have become less and less active (Treuth, Hou, Young & Maynard, 2004). Sedentary behavior is particularly high amongst Hispanic female adolescents (Butte et al., 2007; Whitt-Glover, Taylor, Floyd, Yore, Yancey & Matthews, 2009). Sedentary behavior has been associated with significant increases in BMI and body fat among adolescents (Forshee, Anderson & Storey, 2004; Marshall, Crume, Scherzinger, Stamm, & Dabelea, 2004; Mitchell, Pate, Beets & Nader, 2013).

Study Significance

Lack of physical activity can increase the risk of becoming overweight in adolescence (Mitchell, Pate, Beets & Nader, 2013). Overweight in adolescence increases the risk of developing obesity-related disease at around 30 years of age, leading to premature morbidity and mortality (Eisenmann, Wickel, Welk & Blair, 2004; Engeland, Bjorge, Sogaard & Tverdal, 2003; Thorp, Owen, Neuhaus & Dunstan, 2011). By 2035, researchers project that the prevalence of coronary heart disease in middle age will increase by 5-16%, with more than 100,000 cases attributable to increasing rates of obesity (Bibbins-Domingo, Coxson, Pletcher, Lightwood & Goldman, 2007). By 2050, researchers project that the number of adolescents diagnosed with type 2 diabetes mellitus will almost quadruple—from .27/1,000 to .75/1,000 (Imperatore et al., 2012).

The number one cause of death in the United States is heart disease, a condition that is in many cases directly related to obesity and sedentary behavior (Lloyd-Jones et al., 2010). Among people of Hispanic origin, 4.7% die of diabetes mellitus type 2 annually, compared to 2.6% of Whites and 4.3% of Blacks (U.S. NCHS, 2010).

Hispanic Americans make up the largest minority group in America (U.S. Census Bureau News, 2012). It is vitally important to examine the factors that lead to overweight and sedentary behavior in female Hispanic adolescents in order to prevent these dire health consequences, since this demographic will have a great influence on the future of our nation (Forrest & Leeds, 2007). Furthermore, adolescence is a period in which individuals develop their personal identity and role in society (Meeus, van de Schoot, Keijsers, Schwartz & Branje, 2010). Intervention at this period of life can effect permanent change, integrating physical activity with personal identity and societal role.

Study Purpose

While many research studies that have attempted to increase physical activity in adolescent girls, little is known about how personal characteristics, perceptual influences, interpersonal influences, and sociocultural influences affect the mental, social and physical health of Hispanic adolescent girls. The purpose of this descriptive correlational study was to examine and compare the influence of personal characteristics, perceptual influences, interpersonal influences and sociocultural influences on physical activity in White and Hispanic adolescent girls.

Theoretical Framework: The Physical Activity Lifestyle Model

The Physical Activity Lifestyle Model (PALM; see Figure 1) was developed (Brown, 2009) based on adolescent health research findings (Pender, 1996; Pender, Murdaugh & Parsons, 2006; Neumark-Sztainer, Story & Wall, 2004; Robbins, Pender & Kazanis, 2003; Wu, Pender & Noureddine, 2003; Wu & Pender, 2005). In the PALM, I diagrammed the factors that influence physical activity in adolescent girls. I designed the original version of the PALM (see Figure 1) to diagram the psychosocial, biological,

cognitive and behavioral factors that contribute to physical activity within a health promotion framework. There were three major categories in the original version of the PALM-- Individual Characteristics and Experiences, Physical Activity-Specific Cognitions and Affect, and the Behavioral Outcome. Individual Characteristics and Experiences deal with factors that are, for the most part, related to past experience and personal identity. The sub-category, Prior Related Behaviors, deals with an adolescent girl's past experience with physical activity, which affects her attitude toward regular physical activity (PA-related affect), and her belief in her ability to be regularly physically active (PA self-efficacy), ultimately affecting the behavioral outcome, Current Physical Activity Behaviors.

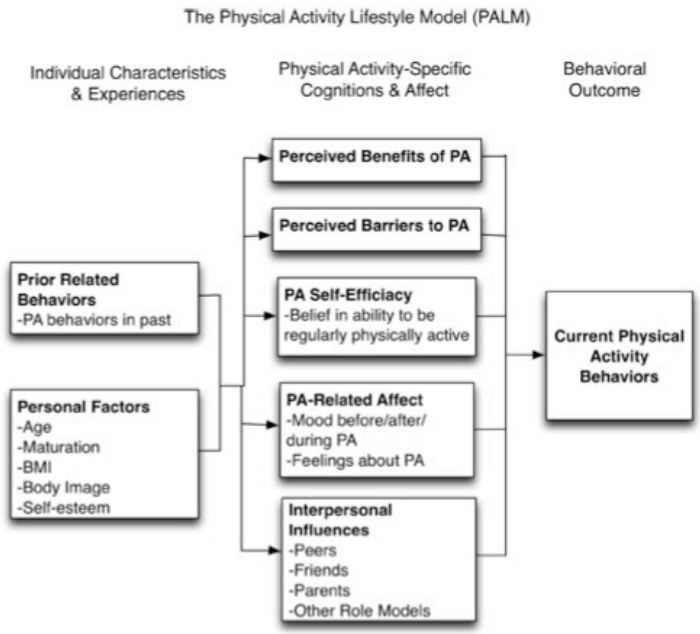


Figure 1: The Physical Activity Lifestyle Model, as published in *Issues in Comprehensive Pediatric Nursing* (Brown, 2009). I obtained permission to include this figure from the journal's editors.

Past experience with physical activity frequently involves parents; peers, friends and other role models (Interpersonal Influences), and these individuals can both directly and indirectly influence an adolescent girl's Current Physical Activity Behaviors (Neumark-Sztainer, Boutelle & Story, 2007).

In a later revision of the PALM, I eliminated past experience with physical activity due to difficulties with measuring such a longitudinal-type variable. The second sub-category, Personal Factors, includes age, [pubertal] maturation, Body Mass Index (BMI), body image, and self-esteem. I propose that these factors influence PA-Related Affect, PA self-efficacy, and Current Physical Activity Behaviors. Upon further study of this sub-category, the incongruence was noticeable-- age, maturation, and BMI were physical factors, body image and self-esteem were affective and cognitive factors. I re-categorized the variables in this category in the Revised PALM, as I discuss in further detail later. Perceived Benefits of PA and Perceived Barriers of PA-- individual opinions of what makes maintaining Current Physical Activity Behaviors easier or harder-- are positively and negatively related, respectively, to the outcome. PA benefits and barriers are also negatively related to each other: the more perceived benefits to PA, the fewer perceived barriers to PA. In addition to the relationship to Prior Related Behaviors, PA Self-Efficacy is also related to Interpersonal Influences, and Current Physical Activity Behaviors. Interpersonal Influences (parents, peers, friends and other role models) can (through their encouragement, discouragement, and role modeling) either positively or negatively contribute to PA Self-Efficacy and Current Physical Activity Behaviors. Similarly, PA-Related Affect (feelings about PA, and mood before, after and during PA) can influence Current Physical Activity Behaviors, but can also positively or negatively

impact Interpersonal Influences. I extensively revised this version of the PALM, as I will explain in the next paragraph, in order to focus on the relationships between a specific set of variables.

The Revised Physical Activity Lifestyle Model.

I designed the Revised Physical Activity Model (R-PALM) to focus specifically on the interrelationships between specific biological, perceptual, interpersonal and sociocultural factors that contributed to physical activity in adolescent girls. In other words, I sought to explain the direct and indirect influence of personal characteristics, perceptual influences, interpersonal influences, and sociocultural influences on physical activity. As is shown in Figure 2, the R-PALM does not contain the sub-categories, Prior Related Behavior, Perceived Benefits to PA, Perceived Barriers to PA, PA-Related Affect or PA Self-Efficacy. Additionally, I added two sub-categories, Perceptual Influences and Sociocultural Influences. I changed Personal Factors to Personal Characteristic, and simplified Current Physical Activity Behaviors to Physical Activity.

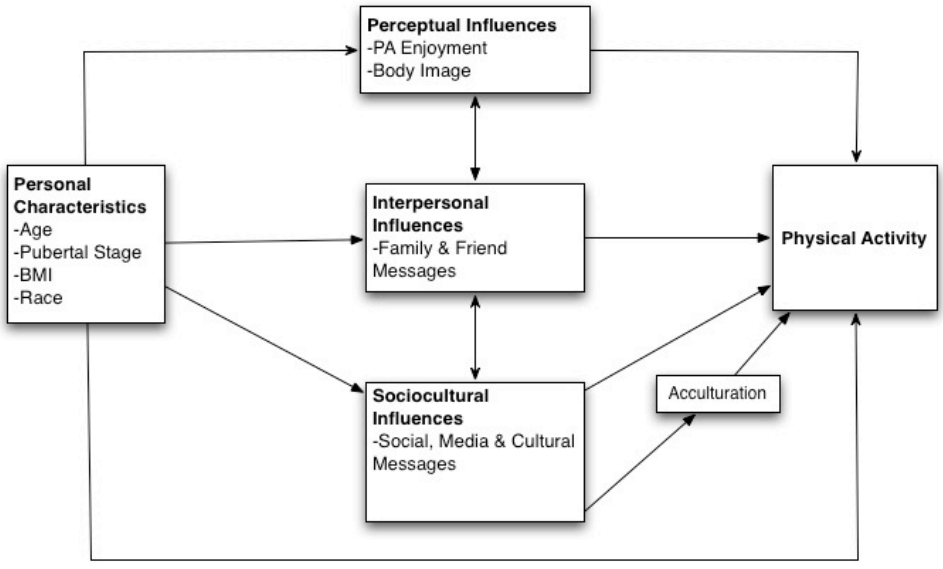


Figure 2. The Revised Physical Activity Lifestyle Model.

I made these changes for several reasons. First, there was a need to separate out biological and psychological factors-- Personal Factors was split into Perceptual Influences (body image and PA enjoyment) and Personal Characteristics (age, pubertal stage, BMI and race). Second, a thorough review of the literature revealed that interpersonal influences (family & friend messages) and sociocultural influences (social, cultural and media messages), personal characteristics (age, pubertal stage, BMI and race), and perceptual influences (body image and physical activity enjoyment) were all interconnected, and had a collective influence on physical activity. Third, acculturation, a component of sociocultural influences, was theorized to be a moderator in the relationship between sociocultural influences and physical activity.

Personal Characteristics.

Personal characteristics include age, gender, body mass index (BMI) and pubertal stage. Personal Characteristics influence physical activity enjoyment, which in turn positively influences physical activity. I theorized that these personal characteristics affect perceptual, interpersonal and sociocultural influences on physical activity. There is evidence that age, BMI and pubertal stage are negatively associated with physical activity (Davidson, Werder, Trost, Baker & Birch, 2007). Since sample was entirely female, gender was controlled in this study.

Perceptual Influences.

Perceptual influences include physical activity enjoyment and body image. Biological factors, such as BMI, impact perceptual influences (Thompson et al., 2007). Physical activity enjoyment and body image are lower among children who are

overweight and obese (Deforche, De Bourdeaudhuij & Tange, 2006). Body image and physical activity enjoyment are lower among girls who go through puberty earlier than their peers (Davidson et al., 2007).

Perceptual influences can be either positively or negatively related to interpersonal influences, sociocultural influences, and physical activity. I theorized that if parents are highly supportive and accepting of their adolescent daughter's appearance, then she will be more likely to be satisfied with her body, and more likely to engage in physical activity (Bauer, Neumark-Sztainer, Fulkerson, Hannan & Story, 2011). There is evidence that if parents are critical of their daughter's appearance, then she will be less likely to have a high body image, and will enjoy physical activity less (Dohnt & Tiggemann, 2006).

Interpersonal Influences.

Interpersonal influences represent the effect of messages from parents, peers, friends, and other role models in the adolescent girl's life. These people communicate messages to the adolescent girl about physical activity. I theorized that these messages will either encourage or discourage physical activity, depending on their nature. Encouraging messages, such as parental encouragement to be physically active, are positively related to physical activity. Discouraging messages, such as peer criticism of physical activity, are negatively related to physical activity (Dohnt & Tiggemann, 2006). Family members, peers and friends can act as role models and facilitators for physical activity attitudes and behavior, influencing physical activity enjoyment, body image, and ultimately physical activity (Bauer, Neumark-Sztainer, Fulkerson, Hannan & Story, 2011).

Sociocultural Influences.

Sociocultural influences encompass the effects of society, culture and the media on adolescent girls. Similar to interpersonal influences, culture, society and the media communicate messages to adolescent girls about physical activity habits, messages that can be positive or negative. Negative messages, such as the portrayal of extremely thin body types in the media, have been negatively correlated with physical activity (Gavin, Rodham & Poyer, 2008). I theorized that positive messages, such as the idea that physical activity makes you feel and look better, are positively related to physical activity. I theorized that acculturation (identification with dominant U.S. culture) moderates the relationship between physical activity and sociocultural influences, meaning that cultural identification can positively influence one's media, social and cultural message-influenced tendency to participate in physical activity.

Physical Activity.

The outcome of the model is physical activity among adolescent girls. Physical activity, when performed regularly, can prevent a host of chronic diseases, decrease BMI, and improve physical activity enjoyment and body image. In the model, physical activity is directly influenced by personal characteristics, perceptual influences, interpersonal influences and sociocultural influences. The relationship between physical activity and sociocultural influences is moderated by acculturation.

Research Questions and Hypotheses

In this study, I examined the impact of personal characteristics, perceptual influences, interpersonal influences and sociocultural influences on physical

activity in adolescent girls, and addressed the following research questions (RQ) and hypotheses (H).

Personal Characteristics.

RQ1. How do personal characteristics (age, pubertal stage, BMI and ethnicity) influence physical activity in adolescent girls?

H1. Physical activity will be negatively associated with pubertal stage (as defined by Tanner) and age amongst adolescent girls-- e.g. older and more physically mature participants will be less physically active.

H2. Controlling for age, BMI, and pubertal stage, Hispanic adolescent girls will have lower physical activity than White girls.

Perceptual Influences.

RQ2. How do perceptual influences (physical activity enjoyment and body image) impact physical activity in adolescent girls?

H3. Physical activity enjoyment and body image will be positively associated with physical activity.

H4. Enjoyment of physical activity will be negatively associated with BMI.

Interpersonal Influences.

RQ3. How do interpersonal influences (family and friends) impact physical activity in Hispanic and White adolescent females?

H5. Support for physical activity by family and friends will be positively associated with physical activity in adolescent girls.

Sociocultural Influences.

RQ4. How do sociocultural influences (culture, society and media) impact physical activity in adolescent girls?

H6. Thin ideal internalization, perceived pressures to be thin, and appearance-related media messages will be negatively related to physical activity.

H7. Acculturation moderates the relationship between appearance-related media messages and physical activity.

H8. Acculturation will be negatively associated with higher body image in adolescent girls.

RQ5. How do personal characteristics, perceptual influences, interpersonal influences, and sociocultural influences combine to affect physical activity?

Definition of Terms

Conceptual definitions of key variables and concepts are detailed below. For operational definitions of the key variables, please see Table 1.

Outcome Variable.

Physical Activity: any form of physical movement that results in an increase in heart rate and respiratory rate. There are many different types of physical activities. Some popular physical activities include walking, running, bicycle riding, calisthenics, aerobic dance and sports (such as basketball, volleyball, football, and soccer). For the purpose of this study, physical activity will be measured in minutes per day, intensity and duration.

Physically Active: Participants who report engaging in 1.5-3 hours of moderate-intensity physical activity, or 30-60 minutes of vigorous physical activity during the three-day recall period (DHHS, 2008).

Light physical activity: Low-intensity physical activities are slow walking activities like grocery shopping, walking to class, slow bike riding, wading in a pool, or any *non-strenuous activity* (DHHS, 2008).

Moderate physical activity: Medium-intensity physical activities such as fast walking, bike riding, playing softball, swimming, light yard work or any other *moderately strenuous activity* (DHHS, 2008).

Vigorous physical activity: High-intensity physical activities such as playing basketball, soccer, football, running, stair-climbing, or any other *strenuous activity* (DHHS, 2008).

Table 1

Operational Definitions of Key Variables and Instruments

Variable	Place in Model	Instrument	# Items	Scoring	First Author (Year)
Physical Activity	Outcome	Self-Administered Physical Activity Checklist	28	Total minutes of PA, total minutes of TV/Video time	Sallis (1996)
BMI	Personal Characteristics	Calculated from height and weight (measured @ clinic)	5	Ordinal data	PI
Age	Personal Characteristics	Demographic Questionnaire	5	Ordinal data	PI
Ethnicity	Personal Characteristics	Demographic Questionnaire	5	Numbers assigned to race	PI
Pubertal Stage	Personal Characteristics	Pubertal Development Scale	6	Rate development on 1-4 scale, sum total	Petersen (1988)
Body Image	Perceptual Influences	Contour Drawing Rating Scale	2	Subtract current - ideal body size	Wertheim (2004)
PA Enjoyment	Perceptual Influences	PA Enjoyment Scale	16	Likert Scale, sum total	Motl (2000)
Friend/Family Support for PA	Interpersonal Influences	Social Support for Exercise Survey	13	Likert Scale, sum total	Prochaska (2002)
Thin Ideal Internalization	Sociocultural Influences	Sociocultural Attitudes Toward Appearance Questionnaire	30	Likert Scale, calculate subscale	Thompson (2004)
Pressure to Be Thin	Sociocultural Influences	Sociocultural Attitudes Toward Appearance Questionnaire	30	Likert Scale, calculate subscale	Thompson (2004)
Appearance-related Media Consumption	Sociocultural Influences	Sociocultural Attitudes Toward Appearance Questionnaire	30	Likert Scale, calculate subscale	Thompson (2004)
Acculturation	Sociocultural Influences	Short Acculturation Scale for Hispanics – Youth	12	Likert scale, sum total	Barona (1994)

Personal Characteristics.

Personal Characteristics: These are facets of biological and personal identity that influence physical activity. This definition includes BMI, pubertal stage, age and gender.

Body Mass Index: is a statistical calculation that allows one to compare the proportion of body weight to body height and is equal to the body weight (in kilograms) divided by the squared height (in meters). For children and adolescents, BMI is plotted on the CDC height and weight growth charts (separated by sex) to determine the BMI-for-age percentile (Must, Dallal & Dietz, 1991).

Overweight: The physical state of having more body fat than is optimally healthy. Overweight in adolescence is defined as a BMI greater than or equal to 85th percentile, and less than the 95th percentile for adolescents of the same age and sex (Must, Dallal & Dietz, 1991).

Obese: The physical state of excess body fat accumulation to the extent that the adolescent's health may be negatively affected. Obesity in adolescents is defined as a BMI greater than or equal to the 95th percentile for adolescents of the same age and sex (Must, Dallal & Dietz, 1991).

Hispanic: A group of people who self-identify as being of Latin American descent, primarily from Mexico, but also from Cuba, Puerto Rico, Central or South America (U.S. Census Bureau News, 2012).

Adolescence: The developmental period between childhood and adulthood, in which many physical, emotional and social changes take place in the individual's life. For the purpose of this study, "adolescent" will refer to early adolescence-- e.g. children aged 11-14. I chose this stage because I wish to study factors that influence physical activity during puberty, and this is the age at which the majority of adolescent girls go through puberty (Tanner, 1990).

Puberty: A period of human development in which physical growth and sexual maturation occur (Tanner, 1962).

Pubertal Stage: The stage of sexual maturation, as classified by the changes in secondary sexual characteristics (Tanner, 1975). In females, this determination is based on hair growth in axillae and pubis, as well as breast development. According to Tanner, stage I represents pre-puberty, while stage IV represents late puberty, near-adult maturation. (Tanner, 1990).

Perceptual Influences.

Perceptual Influences: Thoughts and feelings related to physical activity. This definition includes physical activity enjoyment and body image.

Physical Activity Enjoyment: An emotional state that reflects feelings of fun, delight and pleasure when participating in physical activity (Motl et al., 2001).

Body Image: The subjective perception of, and satisfaction with, the appearance of one's own body (Gerrig & Zimbardo, 2009). High body image refers to an adolescent girl's contentment with the way her body appears, and low body image refers to an adolescent girl's discontentment with the way her body appears.

Interpersonal Influences.

Interpersonal Influences: The impact of family members and friends on adolescent girls' choice to participate in physical activity.

Friends and Peers: Adolescents of the same or similar age group (11-14 years) who associate with the participants on a regular basis. These associations may be in the participants' school, church, or neighborhood.

Family: Immediate and extended family of the participants—parents, stepparents, siblings, step-siblings, grandparents, cousins, aunts and uncles.

Sociocultural Influences.

Messages: Verbal or non-verbal expressions that communicate values and opinions on a certain topic, such as ideal physical appearance.

Sociocultural Influences: The impact of media messages, cultural messages, and social messages on adolescent girls' choice to participate in physical activity.

Acculturation: The process of change that occurs when two cultures come into direct contact with each other (Berry, 1992). In this study, acculturation will represent the degree to which adolescent girls in the study identify with dominant United States culture (Serrano, 2003).

Thin-ideal internalization: The extent to which adolescent girls believe that the ultra-thin figures presented in the media represent the ideal body figure, and the extent to which they try to approximate this ideal with their own bodies (Thompson & Stice, 2001). Thin ideal internalization is a facet of media messages, a part of sociocultural influences.

Perceived pressures to be thin: These are comments or actions by others that may serve to encourage adolescent girls to believe they need to conform to thin ideal images portrayed in the media (Thompson & Stice, 2001).

Appearance-related media messages: The standards of attractiveness that are conveyed via media representations of women and attractiveness in general (Henderson-King & Brooks, 2009).

Assumptions

This study is based on the following assumptions:

1. Most measurable attitudes are held strongly enough to direct behavior. In other words, adolescents' beliefs are held strongly enough to influence the various areas of the model.
2. Statistically significant differences found will relate to the variables under consideration. Although the literature supports the possibility of statistically significant differences, some of these variables have not been tested specifically in adolescent girls.
3. People operate on the basis of cognitive, affective, emotional, interpersonal and sociocultural messages. Adolescent girls are able to process this information, make choices and form personal identity and beliefs based on this information.
4. Participants will complete the survey truthfully. Participants' responses will be an accurate representation of their actual opinions.
5. Adolescent females have the capacity for reflective self-awareness and are able to assess their own competencies. However, adolescents (particularly females) may have a developmental tendency for under-estimation of their competencies.

Limitations

1. Due to the nature of this cross-sectional study, generalizations to a larger population may not be accurate.
2. The sample for this study will be drawn from several schools, within the small geographical area of Del Valle, Texas. Results may not be generalizable to other populations.
3. The model on which this study is based is narrow in scope-- only looking at a few select variables.
4. Nutritional intake is not being measured in this study.
5. Bullying is not being measured in this study.
6. Physical activity is being measured by self-report, and only in a 1-day recall. It is unknown whether this 1-day recall is typical of the participants' physical activity.
7. Intensity of physical activity is not being measured.

Summary

In this chapter, I provided an introduction to my research study, which included the problem, study purpose, an explanation of the theoretical framework, the revised PALM, and relevant hypotheses and research questions. I concluded the chapter by listing assumptions and limitations of my research study.

Chapter 2: Review of Literature

In this chapter I will review the literature related to physical activity, as well as the relationships among the independent variables (personal characteristics, interpersonal and sociocultural influences) and the dependent variable (physical activity) for this study of adolescent girls. First, I will introduce the concept of adolescence. Second, I will present the physical and emotional effects of overweight and obesity. Third, I will discuss the evidence for the relationships among the concepts proposed by the revised physical activity lifestyle model (R-PALM), the model developed to guide my research.

Adolescence

Early adolescence (11-14 years of age) is a period of rapid change (Tanner, 1975). These changes are physical, psychological, sociocultural and interpersonal (Rew, 2005). Physically, adolescent girls experience breast development, pubic and axillary hair growth, an increase in hip size, menarche, and dramatic increases in height and weight. See Appendix A. Adolescent girls find their body changing, becoming longer, rounder, heavier and perhaps clumsier as they become accustomed to their new proportions. These physical changes necessitate a shift in psychological identification-- from little girl to woman (Pipher, 2005). Additionally, at this time adolescent girls are developing their personal identity and role in society (Meeus, van de Schoot, Keijsers, Schwartz & Branje, 2010). Hispanic adolescent girls are working to develop their ethnic identity-- trying to find a balance between the predominant Western culture (e.g.

thin-ideal internalization) and the ideal of their families' Latin American culture (Phinney & Rosenthal, 1992, Matsunaga, Hecht, Elek & Ndiaye, 2010).

This developmentally-influenced identity shift is made more difficult when girls receive conflicting sociocultural messages from society, culture, parents, peers, and the media about what women should believe, and how they should appear and behave (Pipher, 2005). If an overweight or obese adolescent girl finds that her own appearance, behavior and beliefs differ from what she perceives as desirable, she may develop unhealthy eating habits, poor mental health, and low physical activity (Dohnt & Tiggemann, 2006; Vartanian & Shaprow, 2008).

Overweight in Adolescence

Although there were significant increases in the incidence of overweight and obesity in the 1980's and 1990's, from 1999-2010, prevalence of obesity (18.4%) and overweight (33.6%) in adolescents age 12-19 years appears to have stabilized (Ogden, Carroll, Kit & Flegal, 2012). Adolescents have a higher rate of overweight and obesity than younger children (Ogden et al., 2012).

Overweight in Hispanic Adolescent Girls.

Hispanic adolescent females have a significantly higher rate of obesity than their White peers (Huh, Stice, Shaw & Boutelle, 2011). The prevalence of overweight in Hispanic adolescent females is second only to Black adolescent females (Ogden, Carroll, Kit & Flegal, 2012). According to the NHANES III, 1999-2000, 43.4% of Hispanic females aged 12-19 years are obese overweight or at risk for overweight (Ogden et al., 2012). In comparison, 30% of White

adolescent females are obese, overweight or at risk for overweight, and 26.6% of Black adolescent females were overweight (Ogden et al., 2012). Among Texan 11th-graders (~16-17 years of age), Hispanic adolescent females had a higher median Body Mass Index, or BMI, (at 23.7 kg/m^2) than their White female (22.2 kg/m^2), Black female (22.9 kg/m^2) or Hispanic male (23.0 kg/m^2) peers (Hoelscher et al., 2004).

Co-Morbidities of Obesity in Adolescence.

Obesity and overweight in adolescence are associated with numerous co-morbidities, such as high cholesterol, high blood pressure, atherosclerosis, insulin resistance and diabetes type 2 (Kriska, Saremi, Hanson, Bennett, Williams, & Knowler, 2003; Wake et al., 2010). Arterial stiffness and atherosclerosis, both early signs of cardiovascular disease, were found to be present in overweight, sedentary, and insulin resistant adolescents (Berensen, Srinivasan, Weihang, Newman, Tracy, & Wattigney, 1998; Urbina, Gao, Khoury, Martin & Dolan, 2012). Atherosclerosis and arterial stiffening were previously thought to occur only in older adults.

Another obesity-related disease previously thought to occur only in adults was diabetes mellitus type 2. Overweight is a major risk factor for developing insulin resistance, which leads to diabetes mellitus type 2 (Kretschmer et al., 2004; Kriska et al., 2003; Urbina, Gao, Khoury, Martin & Dolan, 2012). Yau et al. (2010) found that adolescents with diabetes mellitus type 2 developed brain abnormalities-- significantly lower IQ, poorer verbal memory, and poorer psychomotor efficiency as well as decreased white matter compared to

adolescents without diabetes mellitus type 2. Over the past 30 years, there has been a rise in the number of adolescents who are at risk for diabetes mellitus type 2 or are diagnosed with type 2 diabetes mellitus (STOPP-T2D, 2006). There is a higher prevalence of diabetes mellitus type 2 among Hispanic adolescents than among White adolescents (Sharp, Grunwald, Kristen, Giltinan, King, Jatkauskas, & Hill, 2003). Girls in general are at higher risk for diabetes mellitus type 2, partially due to the fact that they tend to be less physically active than boys (Maligie et al., 2012; Marshall, Crume, Scherzinger, Stamm, & Dabelea, 2004).

Overweight in Adulthood

Overweight in adolescence can lead to overweight (BMI = 85th - 95th percentile) or obesity (BMI > 95th percentile) in adulthood, increasing adult morbidity and premature mortality (Engeland et al., 2003). Adult women have a greater percentage of obesity than men (18.3% vs. 12.5%; Flegal, Carroll, Kit & Ogden, 2012). During the childbearing years, obese women are at high risk for developing polycystic ovary syndrome, infertility, and complications in pregnancy (Kulie, Slattengren, Redmer, Counts, Eglash & Schrager, 2011). After menopause, women are at higher risk for obesity-related morbidity and mortality than men (Bibbins-Domingo et al., 2007; Engeland et al., 2003).

In fact, adolescent BMI predicts adult mortality, according to a Norwegian longitudinal study, which tracked mortality in 227,003 individuals from adolescence to middle age (Engeland et al., 2003). Females who were obese in adolescence (BMI > 95th percentile) had 100% higher mortality rate in adulthood (age 30-58 years) than females who were not obese in adolescence (BMI < 95th

percentile; Engeland et al.). Obesity in adolescence also significantly predicted ($p < .001$) type 2 diabetes mellitus at age 39 in two longitudinal U.S. studies ($N = 1,889$; Morrison, Glueck, Horn & Wang, 2010).

van Dam, Willet, Manson & Hu (2006), tracked mortality in female nurses 24-44 years of age for 12 years and found similar results. Their retrospective study asked participants about their health at 18 years of age, then examined mortality 12 years after data collection. The researchers found that women who were overweight at age 18 were one and a half times more likely to die early, while women who were obese at age 18 were twice as likely to die early (van Dam et al., 2006). By 2030, researchers project 492,000-669,000 new cases of obesity-related cancer, 5.7-7.3 million new cases of stroke and cardiovascular disease, 6-8.5 million new cases of diabetes, and 65 million new obese adults, costing the U.S. an additional $48-66 billion per year in treatment of these obesity-related diseases (Wang, McPherson, Marsh, Gortmaker & Brown, 2011).

Sedentary Behavior

Along with the increasing prevalence of overweight, Americans have become more sedentary. Sedentary behavior is defined as prolonged participation in activities that involve little or no physical activity, such as television (TV) watching, playing video games, or using a computer (Ianotti, Kogan, Janssen & Boyce, 2009). Sedentary behavior, along with overweight, can contribute to the development of co-morbidities such as diabetes mellitus type 2, cardiovascular disease and cerebrovascular disease (Kretschmer et al., 2004; Patrick et al., 2004; Thorp et al., 2011).

Sedentary Behavior in Hispanic Adolescent Girls.

Hispanic girls are especially at risk for sedentary behavior, since they watch TV at a rate second only to Black girls. Data from the national Youth Risk Behavioral Surveillance Survey (YRBSS) data (n=15,425) reveals that 37.2% of Hispanic girls watched 3 or more hours of TV per day, compared to 23.9% of White girls (CDC, 2012). Hispanic girls also have the second-lowest rate of physical activity participation—21.3% were physically active less than once a week compared to 26.7% of Black girls, and 13.7% of White girls (CDC, 2012).

Physical Activity in Adolescence: Ethnic, Gender, and Geographic Variations

Only 11.9% of Hispanic adolescent girls exercise 7 days a week, compared to 17.0% of White adolescent girls (Lowry, Lee, Fulton, Demissie & Kann, 2013). Adolescent females in general report a lower rate of physical activity than boys—22.2% of high school aged girls and 30.1% of high school aged boys in a large (N~14,000) national sample (Lowry, Lee, Fulton & Kahn, 2009). Among Texan 8th grade girls (mean age 13.7 years, n = 8, 827) active participation in P.E. ≥ 4 days per week was 1.5 times as high in rural students (68.1%) as it was in suburban (42.4%) and urban (49.0%) students (Springer, Hoelscher, Castrucci, Perez & Kelder, 2009).

Benefits of Physical Activity

Physical activity has been significantly associated with reduction of many health problems in adolescence (Brown, Galuska, Zhang, Eaton, Fulton, Lowry & Maynard, 2007; Colberg et al., 2010, Forshee, Anderson & Storey, 2004; Kirk,

Zeller, Claytor, Santangelo, Khoury & Daniels, 2005; Strohle et al., 2007). Adolescents who engage in regular physical activity (3 or more times a week) can significantly reduce their risk for developing cerebrovascular disease in adulthood (Lee, Artero, Sui & Blair, 2010; Twisk, Kemper & van Mechelen, 2002). Physical activity has been shown to reduce body fat in overweight adolescents (Lee et al., 2010). Physical activity has also been shown to reduce risk factors for diabetes mellitus type 2 in overweight adolescents (Colberg et al., 2010). Furthermore, there is a lower prevalence of mental disorders such as depression and anxiety among adolescents who engage in physical activity (Strohle et al., 2007).

Past Physical Activity Interventions

In the past, physical activity promotion research has been of varying quality. Studies have used small, poorly-designed studies, and used inconsistent measurement techniques (Hudson, 2008). In addition, the majority of studies examined physical activity and nutrition behaviors alone, without consideration of the underlying psychosocial, interpersonal and environmental issues that influence adolescent girls' physical activity habits (Brown, 2009).

As a result, few of these interventions have successfully increased physical activity, and fewer still have reported (or even measured) long-term success (Nelson, Gordon-Larsen, Adair & Popkin, 2005). Little is known about the influence of culture, society, peers, and family on the physical activity habits of adolescent girls, particularly Hispanic adolescent girls (Brown, 2009). This study will seek to fill in the knowledge gaps and add to the research base in the

field of psychosocial and sociocultural contributors to physical activity. The results of the proposed research study will assist researchers to design appropriate and effective physical activity interventions for adolescent girls.

Discussion of Proposed Variables

The relevant literature on physical activity will be discussed within the context of the revised PALM. Relationships among the independent variables will also be discussed below.

Personal Characteristics.

Personal Characteristics can influence perceptual influences and participation in physical activity in adolescent girls. Personal Characteristics include age, pubertal stage, ethnicity, female gender, and Body Mass Index (BMI).

Biological Changes During Puberty

Adolescent girls experience numerous rapid physiological changes during puberty. Besides birth, adolescence is the only period of life when the rate of physical growth actually accelerates (Spear, 2002). Puberty is the period when the greatest sex differentiation since early fetal development occurs (Tanner, 1990).

Tanner (1962) described a method to assess stages of development using secondary sexual characteristics in males and females that occurs during puberty. Tanner identified five stages, the first being pre-puberty and the fifth being post-puberty, e.g. full adult development. The beginning of puberty for females is marked by the growth spurt (an increase in height and pelvic width), though it

may occur a year before the development of secondary sexual characteristics. Before puberty, girls average 5-6 cm of height growth per year. During puberty, girls average 9 cm of growth per year (Alsaker & Flammer, 2006). The first visible sign of sexual development that is noticed in females is the development of the breast bud (an elevation of the breast and papilla as a small mound, with slight expansion of the areola), corresponding to Tanner Stage 2, which occurs from 8.8 to 12.8 years of age. Pubic hair begins to appear 6 months later, although in a third of girls, this order is reversed (Tanner, 1990).

Menarche occurs relatively late in puberty, at an average age of 12.8-13.2 years. At menarche, most girls are at breast stage 4 (near-adult development) although 24% are at stage 3, and a small percentage of girls are earlier. Pubic hair development is usually in stage 3 or 4, but some girls are at stage 5 at menarche, and a small percentage of girls are at stage 1. Permanent enlargement of the external genitalia occurs shortly before menarche (Tanner, 1962). Menarche occurs simultaneously with the slowing of the growth spurt (Tanner, 1962). Girls seldom grow more than 4% after menarche (Alsaker & Flammer, 2006).

Besides height growth, girls also experience a change in body composition and a change in location of fat deposits, during puberty. By the time puberty has finished, girls have twice as much fat as boys (Alsaker & Flammer, 2006). Males, on the other hand, have an increase in lean mass (muscle, lean tissue) and a decrease in fat during puberty. Although athletic performance between males and females is identical before puberty, there is a wide gap in performance that occurs during puberty, and adolescent girls frequently see a drop in athletic performance

during puberty (Tanner, 1990). This extreme physical differentiation can be unsettling to adolescent girls and can lead to body dissatisfaction and weight concern (McCabe & Ricciardelli, 2003; Newman & Newman, 1997).

Variations in Pubertal Development

There is considerable variation in the sequence of events of puberty between individual females, based on genetic predisposition, BMI, nutrition, and even psychological and somatic well-being (Alsaker & Flammer, 2006). The findings discussed above are Northern European female adolescents. Ethnic, gender, geographic, historical and environmental variations among American adolescents from 1860 to the present day will now be discussed.

In the United States, the average age at menarche steadily decreased from 12.75 years in a nationally representative sample collected in 1963 to 12.36 years from a sample collected in 2002 (Andersen, Dallal & Must, 2003; Andersen & Must, 2005). Rosenfeld, Lipton and Drum (2009) found that overweight girls are nearly four times more likely to have menarche at 10.6 years of age than non-overweight girls. Deardorff, Berry, Millett, Rehkopf, Luecke, Lahiff and Adams (2012) found that excess maternal gestational weight gain was associated with early menarche in their daughters. Sun et al. (2005) found ethnic differences in the historical development of secondary sex characteristics. Hispanic girls in a 1994 cohort had significantly earlier ages at entry into Tanner breast stage 4 than a 1984 cohort (Sun et al., 2005). Additionally, Hispanic girls in the later cohort had significantly later entry into Tanner's pubic hair stage 5 than the earlier (1984) cohort (Sun et al., 2005). Compared to White girls, Hispanic girls are

younger at each stage of breast development and older at each stage of pubic hair development (Sun et al., 2002). Hispanic girls' average age at menarche is 9 years of age, a year earlier than White girls (Rosenfeld, Lipton & Drum, 2009). Wang (2002) found that overweight Hispanic girls were 1.5 times more likely than White girls to enter puberty early. BMI can partially account for these racial and ethnic differences. Schubert, Chumlea, Kulin, Lee, Himes, and Sun (2005) found that girls who had higher Tanner breast stage than pubic hair stage had significantly greater BMI than girls who had higher Tanner pubic hair stage than breast stage.

Environmental pollutants can also influence pubertal maturation, as Staessen et al. (2001) found that girls who lived in a highly polluted urban area had lower Tanner breast stage (e.g. older age at puberty) than girls in a less polluted suburban area. Chen, Chung, DeFranco, Pinney & Dietrich (2011) found that higher blood concentrations of polybrominated diphenyl ethers (PBDEs), predicted slightly earlier age at menarche. Furthermore, adolescent girls who experience an emotionally polluted environment, such as emotional, sexual and physical abuse, are likely to experience slower growth, or late onset of puberty, or even stunted pubertal development (Tanner, 1990).

Psychosocial Changes During Puberty

The increase in body weight and shape associated with puberty can decrease mental health, resulting in self-reported depression and low self-esteem (Ge, Elder, Regnerus & Cox, 2001; Yuan, 2007). The early onset of puberty can

lead to lower self-reported body image, mental health, and lower physical activity enjoyment in White girls (Davidson et al., 2007).

Puberty and Physical Activity

The transition to puberty is a difficult and risky time for adolescents, both physically and mentally. For reasons discussed earlier, puberty onset is a major contributing factor in the decreasing rate of physical activity participation in girls over the adolescent years (Dumith, Gigante, Dominguez & Kohl, 2011; Thompson, Baxter-Jones, Mirwald & Bailey, 2003). On average, the amount of moderate (such as walking or bike riding) or vigorous (such as running or playing basketball) physical activity is higher in prepubertal girls than in post-pubertal girls (Saygin, Zorba, Karacabey & Mengutay, 2007).

Although physical activity in girls usually begins to decrease at around age 13, it often decreases earlier in girls who start puberty earlier (Davisdon, Werder, Trost, Baker & Birch, 2007). For example, girls who start puberty at age 11 have significantly lower levels of moderate and vigorous physical activity at 13 years of age than girls who mature later (Baker, Birch, Trost & Davidson, 2007).

Puberty and Disease Risk

In addition to the risk for decreased physical activity, adolescent girls in the pubertal period, particularly early-maturing girls, are also at greater risk for overweight or obesity (Currie, Ahluwalia, Godeau, Gabhainn, Due & Currie, 2012; Ribeiro, Santos, Duarte & Mota, 2006). Along with overweight, the onset of puberty can accelerate the development of diabetes mellitus type 2 in Hispanic

adolescents, who are already at-risk for disease due to sedentary behavior and overweight (Goran, Ball & Cruz, 2003; He, Zhang, Hunter, Hankinson, Louis, Hediger & Hu, 2009). This is because insulin resistance is significantly higher in children in Tanner stage I, pre-puberty, than in Tanner stages III-IV, middle to late puberty (He et al., 2009; Moran, Jacobs, Steinberger, Hong, Prineas, Luepker, & Sinaiko, 1999). During puberty girls are at higher risk than boys because girls are significantly more insulin resistant during all Tanner stages than boys, though girls' insulin resistance risk decreases later in puberty (Moran, Jacobs, Steinberger, Hong, Prineas, Luepker, & Sinaiko, 1999).

Perceptual Influences.

Perceptual influences refer to feelings that occur before, during and after physical activity. The quality of these feelings, whether they are positive (delight, enjoyment) or negative (disgust, anxiety) can affect the likelihood that an individual will engage in physical activity in the future (Pender, 2006). Perceptual Influences also includes emotions related to body image and physical activity enjoyment.

According to Pender (2006), activity-related affect is directly associated with the outcome goal. Therefore, it stands to reason that positive perceptual influences would be correlated with increased frequency of physical activity in adolescent girls. Davidson et al. (2007), in their study of 178 Pennsylvania White girls 11 years of age, found that enjoyment of physical activity was significantly associated with self-reported physical activity (r=.49, p>.01). Ross, Dowda, Beets and Pate (2013), in their study of 479 highly physically active and 1,387

rarely physically active 8th grade girls from 36 middle schools across the United States, found that highly active girls reported greater enjoyment of physical activity than low-active girls. Overweight can also influence physical activity enjoyment and physical activity participation. Overweight adolescents reported lower physical activity enjoyment than normal-weight adolescents (Fairclough & Stratton, 2006). Deforche, De Bourdeaudhuij and Tanghe (2006), in a study of overweight and obese adolescents (*N*=28, predominantly White, 72% female, mean age 14.6 ± 1.2 years) perceived significantly more negative aspects of physical activity than their normal-weight peers (*n*=37): overweight adolescents had a less positive attitude, were more dissatisfied with their body, and had less enjoyment of physical activity ($p<0.01$-0.05;).

Interestingly, preliminary studies suggest that physical activity can positively influence mood and body image. A focus group of 44 White and Maori New Zealand high school students reported improvements in mood and confidence during physical activity (Hohepa, Schofield & Kolt, 2006). Students from grades 2-11 (*N*= 213) reported in focus groups that they felt a sense of achievement, improved self-esteem, reduced anxiety, and reduced guilt as a result of increasing physical activity (O'Dea, 2003). Jerstad, Boutelle, Ness and Stice (2010) found that a bidirectional relationship between physical activity and depression—e.g. that physical activity reduced the severity of depression, but that depressive symptoms could also reduce physical activity.

In a 6-week aerobic dance intervention for 50 British girls age 13-14, researchers found a significant improvement ($p<.05$) in body image due to their

intervention (Burgess, Grogan & Burwitz, 2006). Alternatively, Gehrman, Hovell, Sallis and Keating (2006) reported very little change in physical activity from their 8-week physical activity, nutrition and behavior modification intervention. Among their sample of 84 Southern California children 10-12 years of age, the researchers found a positive, but non-significant, change in body image when physical activity was increased, but no significant difference between the intervention and control groups (Gehrman, Hovell, Sallis & Keating, 2006). However, the results are inconclusive, since little other research exists in this area.

In summary, perceptual influences can influence physical activity participation. Physical activity participation increases body image and physical activity enjoyment, creating a feedback loop. Adolescents who are more physically active will have greater physical activity enjoyment and body image. Overweight and obese adolescent girls who are less physically active will have poorer body image and lower physical activity enjoyment. Physical activity can serve to increase body image as overweight adolescent girls watch their body change and become more tolerant of physical activity.

Interpersonal Influences.

The studies summarized in this section demonstrated that adolescent girls' physical activity habits are significantly influenced by the people closest to them. Family members, friends and peers serve to introduce and reinforce norms for behavior and personal appearance, as well as act as role models and facilitators for attitudes and behavior related to physical activity, body image, and physical activity enjoyment.

Family

Parents and siblings communicate messages to adolescent girls about their weight and shape that have a significant impact on the adolescent girls' physical activity, affect and body image. Minority and overweight girls are particularly at risk. Taylor et al. (2006) found minority status and overweight were positively related to adolescent girls' reporting negative comments from parents and siblings about their weight. Parental encouragement to lose weight and be physically active has a stronger influence on body dissatisfaction and physical activity in adolescent females than on adolescent males, who tend to be more internally motivated (McCabe, Ricciardelli & Holt, 2010). Comments about weight from parents and siblings are associated with body dissatisfaction, depressive symptoms, lower self-esteem and disordered eating in adolescent girls (Fulkerson, Strauss, Neumark-Sztainer, Boutelle & Story, 2007; Keery, Boutelle, van den Berg & Thompson, 2005).

Not all family messages are negative ones. Adolescent girls' mental and physical health can be more effectively promoted if parents see their child's excess weight as a family problem, rather than focus exclusively on the overweight adolescent, as is the tendency for most families (Jackson, Faga & McDonald, 2004). Parental emotional support for physical activity, role modeling of physical activity, and the belief that exercise is important is significantly associated with physical activity frequency, intensity and duration (Kahn, Huang, Gillman, Field, Austin, Colditz & Frazier, 2008; Sabiston & Crocker, 2008). Adolescent girls whose parents encourage healthy eating and physical activity are

significantly more likely to have high body image (Kelley, Wall, Eisenberg, Story & Neumark-Sztainer, 2005). Family support for physical activity is significantly associated ($p < .05$) with physical activity (Bauer, Neumark-Sztainer, Fulkerson, Hannan & Story, 2011).

Family environment can continue to influence adolescent girls' mental and physical health into adulthood (Crossman, Sullivan & Bennin, 2006). An adolescent girl's perception that her parents care about her can reduce her risk of overweight in adulthood (Crossman et al., 2006). Adolescents who played sports with their parents were 2.6 times as likely to be active as adults than adolescents who did not (Nelson, Gordon-Larsen, Adair & Popkin, 2005). Thompson et al. (2003), in retrospective qualitative interviews of 15 adult women, found that level of parental support for physical activity during adolescence influenced level of physical activity in adulthood.

Negative family messages can lead to decreased willingness to participate in physical activity, body dissatisfaction, disordered eating and depressive symptoms in adolescent girls, who are more sensitive to parental criticism than adolescent boys. Positive family messages can promote physical activity participation, healthy eating and high body image.

Friends and Peers

Friends and peers also influence adolescent girls' physical activity, eating habits and perceptual influences for good or ill through the messages they convey. Friend and peer body dissatisfaction significantly predict body dissatisfaction and weight control behavior in girls, e.g. girls whose friends express body

dissatisfaction are more likely to be dissatisfied with their own bodies (Dohnt & Tiggemann, 2006). This could be because, as Rayner, Schneiring, Rapee, Taylor and Hutchison (2013) found, adolescent girls tend to select friends that are similar in body dissatisfaction. Adolescent girls report more frequent conversations with peers about appearance than do adolescent boys, and these conversations with peers about appearance are significantly related to body dissatisfaction, talk about dieting, and receiving appearance-based teasing (Jones & Crawford, 2006).

Adolescent girls who are overweight or obese have additional problems. Overweight adolescents report having fewer friends (Strauss & Pollack, 2003), and experience appearance-based teasing more often than average-weight girls (Thompson, Shroff, Herboso, Cafri, Rodriguez & Rodriguez, 2007). Overweight girls are particularly vulnerable to appearance-based teasing in early adolescence (Sweeting, Wright & Minnis, 2005, Wang, Ianotti & Luk, 2010). Friend and peer teasing are more likely to influence body image in younger overweight adolescent girls than in younger average-weight adolescent girls (Thompson, 2007). In a sample of 2,127 predominantly White girls in the United Kingdom, 11-year-old overweight girls reported having significantly fewer friends and experiencing significantly more victimization than their non-overweight peers, whereas 15-year-old girls reported no significant difference (Sweeting et al., 2005). Therefore, it appears that age can influence appearance-based teasing-- younger adolescent girls are more likely than older adolescent girls to experience victimization and teasing.

Appearance-based teasing is more prevalent among adolescent girls than boys-- nearly half (47.4%) of girls report being teased about their weight (Eisenberg, Neumark-Sztainer, Haines & Wall, 2006). Girls who were teased in middle school were more likely to report lower self-esteem, poorer body image, and greater depressive symptoms five years later in high school (Eisenberg et al., 2006).

However, peers and friends can also role model healthy behaviors to adolescent girls. Sabiston and Crocker (2008), in their study of 329 Canadian girls 15-18 years of age, found that role modeling of physical activity, emotional support for physical activity, and pro-activity beliefs were significantly associated with physical activity frequency, intensity and duration.

In summary, friend and peer messages can be encouraging (positive) or discouraging (negative), depending on their content. Friend and peer appearance-based teasing can lead to poor body image and poor mental health. Lack of encouragement or role-modeling of physical activity by friends and peers can make physical activity adolescent girls less likely to engage in physical activity. Overweight and obese girls are particularly vulnerable to appearance-based teasing. On the other hand, encouraging peer messages can lead to increased healthy behavior, such as physical activity.

Sociocultural Influences.

Sociocultural influences are the societal and cultural messages that can influence adolescent girls' physical activity. Sociocultural influences include social messages, cultural messages and media messages. These messages

communicate ideas about what makes a body figure attractive, and the acceptability of physical activity among adolescent girls.

These messages many times represent a thin ideal—a belief that a thin body figure is desirable and attractive, and that a larger body is undesirable and unattractive. Young adolescent girls are more highly influenced by sociocultural pressures than adolescent boys, and the normal weight gain that happens in puberty may clash with the thin-ideal message (McCabe, Ricciardelli & Holt, 2010). McCabe et al., in their study of 560 male and female adolescents in Victoria, Australia, found that sociocultural pressures had a much greater influence on adolescent girls than on adolescent boys, who appeared to be more internally motivated (2010). These sociocultural pressures to conform to a thin ideal can lead to depression and low body image in adolescent girls (O'Dea, 2006; Swallen et al., 2005).

Swallen et al. (2005), in their analysis of data from the U.S. National Longitudinal Study of Adolescent Health (Add Health 1994-1995), representing 4,743 ethnically diverse adolescents in grades 7-12, found that obesity or overweight was a significant predictor of depression (OR=.42, p<.05) and low self-esteem (OR=.54, p<.05) in girls and boys 12-14 years of age.

O'Dea (2006), in a 3-year study of 80 predominately (85%) White 7th grade adolescent girls (*mean age 12.8, S.D.=0.6*) attending an all-girls school in Sydney, Australia found a significant difference between girls with high BMI (top 25% of sample) and girls with lower BMI (bottom 75% of sample). Girls with high BMI differed significantly from girls with lower BMI on self-reported

physical appearance (t=11.2, p<.01) self-worth (t=10.8, p<.01), romantic appeal to others (t=8.8, p<.01) and number of close friendships (t=12.5, p<.01).

Media Messages

Thin ideal messages, pressures to be thin, and appearance-related media messages are ubiquitous in Western mainstream culture. Television, movies, internet, magazines, video games, billboards, and even books idealize and praise the thin body figure while simultaneously shunning the overweight body figure (Glessner, Hoover & Hazlett, 2006; Latner, Rosewall & Simmonds, 2007). In fact, the more hours adolescent girls spend watching television, playing video games or reading magazines, the greater their disapproval of obese body figures (Latner, Rosewall & Simmonds, 2007). Among adolescent girls, television viewing predicts unhealthy weight control behavior and body dissatisfaction, e.g. the more hours per day adolescent girls watch television, the more likely they are to engage in unhealthy weight behavior and express body dissatisfaction (Harrison & Hefner, 2006).

Pro-anorexia and pro-bulimia Internet sites can encourage very thin body figures, and even give advice on unhealthy weight loss behaviors, and how to hide them from parents (Gavin, Rodham & Poyer, 2008; Lipczynska, 2007; Williams & Reid, 2007). A study of 235 female undergraduates found that, after viewing a pro-anorexia web site, participants reported significantly greater negative affect, lower self-esteem and poorer perceived appearance (p < .001) than girls who viewed a home décor website (Bardone-Cone & Cass, 2007).

Media consumption, and its effects, vary by age, race, ethnicity and culture. This is why commercial advertising agencies tailor their advertisements to specific ages and ethnic groups (Huhman et al., 2008). The influence of media messages on young adolescents and overweight adolescents in general has been researched; however, little is known about how Hispanic adolescents in particular respond to thin ideal images in the media. Van den Berg and Neumark-Sztainer (2007), in a longitudinal study of 2,516 Northeastern U.S. middle and high school students, found that middle school girls who reported reading dieting advice from beauty magazines "often" were twice as likely to engage in unhealthy weight control behaviors (such as smoking more cigarettes, fasting and skipping meals; OR=2.04, 95% CI=1.13-3.70, p=.02), and three times as likely to use extreme weight-control behaviors (such as vomiting or laxitive abuse; OR=3.16, 95% CI=1/73-5/77, p<.001) in high school, five years later. Dohnt and Tiggeman (2006) found that watching music television shows and reading appearance-focused magazines (especially those targeted to adult women) predicted body dissatisfaction (specifically desire for a thinner body) in children as young as six years of age.

Media can also have a positive influence on physical activity (Evans, Necheles, Longjohn & Christoffel, 2007; Huhman, Potter, Wong, Banspach, Duke & Heitzler, 2005; Peterson, Abraham & Waterfield, 2005; Wilson, Howell & Hinners, 2001). Public service advertisements on television, radio, the Internet, in-school promotions and in magazines can help raise awareness and encourage healthy behavior. There are several well-known social marketing campaigns to

promote physical activity and nutrition, including the "5-4-3-2-1-Go!" campaign in Chicago (Evans et al.), the "Get Up and Do Something" campaign in Delaware (Peterson, Abraham & Waterfield, 2005), the "Eat Smart, Play Hard" campaign developed by the Department of Agriculture's Food and Nutrition Services (Wilson, Howell & Hinners, 2001), and the "VERB" campaign developed by the Centers for Disease Control and Prevention (CDC; Wong et al., 2004).

The VERB campaign is a good example of the health-promoting potential of media (Bauman, 2008). The CDC funded this national advertising campaign to increase physical activity in children 9 to 13 years of age (Huhman, et al., 2005). According to Wong, et al. (2004, pg. 2), "VERB is not an acronym but is the word *verb* as a part of speech, meaning an action word. The tag line is, 'It's what you do.'" Physical activity promotion messages were distributed via advertisements on children's television networks, radio advertisements, print advertisements, Internet advertisements and in-school promotions. The VERB campaign used sophisticated commercial marketing techniques, and hired advertising agencies to design advertisements for Asian, Hispanic and Black demographics (Huhman et al.). To measure the influence of this campaign, 3,120 pairs of parents and children were surveyed via random digit dialing, at baseline and one year later (Huhman et al.). One year after the campaign was launched, most (74%) of parents and children surveyed were aware of the VERB campaign. Furthermore, researchers found a significant positive relationship between VERB campaign awareness and amount of reported leisure-time physical activity among parents and children (Huhman et al.). The VERB campaign was able to

successfully increase leisure-time physical activity in American adolescents who received VERB media messages.

Although media messages can be used to promote health by broadcasting positive messages, they can also be used to perpetuate and propagate the message of the thin ideal, which can lead to low body image.

Sociocultural Messages

The pervasiveness of thin ideal messages in American culture can lead adolescent girls to believe that a thin body type is the only acceptable body type (Clark & Tiggeman, 2008). This cultural belief can lead to low body image and disordered eating (Austin & Smith, 2008). Culture can play a significant protective role in adolescent girls' physical activity habits (Boyd, Reynolds, Tillman & Martin, 2009; Monge-Rojas, Nuñez, Garita & Chen-Mok, 2002). There may be a counteracting cultural belief in Hispanic culture-- a belief in a curvier ideal body shape. Hispanic adolescent girls who identify with Hispanic culture (less acculturated) are more often accepting of a curvier body ideal than more acculturated Hispanic girls and White girls (Gonzalez, 2007; Pepper & Ruiz, 2007). As a result, Gonzalez (2007) found Hispanic adolescent girls are less likely to be dissatisfied with their bodies, and more likely to have high self-esteem. In contradiction to these findings, the authors of a secondary analysis of 537 Californian Hispanic adolescents, found that identification with Mexican culture predicted greater body dissatisfaction among Hispanic adolescent girls (Ayala, Mickens, Galindo & Elder, 2007). It can sometimes be difficult for Hispanic adolescent girls to reconcile the differences between their parents'

beliefs and their friends' beliefs about ideal body shape. Diaz, Mainous and Pope (2007), in a focus groups of South Carolina Hispanic adults (*N*=19), found that participants expressed confusion with the conflicting messages they received from American and Mexican culture. For example, the traditional Mexican view that being overweight is healthy and attractive, versus the American view that excess weight is unhealthy and unattractive.

In Western society, there is an intense stigma toward overweight and obese individuals. It is represented in the media, but is also manifested in weight-related stereotypes. One study found that Hispanic and White middle-school students selected significantly more negative adjectives (such as lazy, ugly, selfish) and significantly fewer positive adjectives (smart, friendly, nice, etc.) to describe a picture of an obese adolescent versus an average-weight adolescent (Greenleaf, Chambliss, Rhea, Martin & Morrow, 2006). When shown a picture of an overweight female and when asked to write a story about her, participants more often wrote negative stories and created unpleasant characters than when they were writing about average-weight females, or even overweight males (Hiller, 1981). Adolescents also report the belief that obesity is caused by personality shortcomings, such as laziness and greed (Klaczynski, Goold & Mundry, 2004). Perhaps this weight stigma is why adolescents report greater willingness to participate in social, academic and recreational activities with normal weight peers than with overweight peers (Greenleaf et al., 2006).

Weight stigma can have an effect on mental and physical health. In their study of 100 predominately (58%) White young adult girls age 18-25, from a

private Northeastern U.S. university; Vartanian and Shaprow (2008) found that experiences with weight stigma are positively correlated with body dissatisfaction and with an increased desire to avoid physical activity in order to prevent further stigmatization. After controlling for body dissatisfaction and overweight the researchers found that weight stigma was independently associated with physical activity avoidance and decreased physical activity participation (Vartanian & Shaprow, 2008). Diaz (2007) found that highly acculturated Hispanic adolescent girls reported more physical activity than less acculturated girls, and less acculturated girls reported more healthy eating habits (Diaz, 2007).

The stigma toward overweight and obesity in American culture can lead to the development of poor body image, unhealthy eating habits, and low physical activity among adolescent girls. However, acculturation may positively influence physical activity in Hispanic adolescent girls.

Summary

Of all the factors discussed, interpersonal and sociocultural influences appear to have the greatest influence on physical activity among adolescent girls. Of interpersonal influences, peer and parental messages have the greatest impact on adolescent girls' physical activity. Of the sociocultural influences, media messages (e.g. thin-ideal messages, appearance-related media messages, and pressures to be thin) appear to have the greatest influence on adolescent girls' health behavior. Personal Characteristics, particularly pubertal stage, age and BMI, also influence physical activity.

Chapter 3: Research Design and Methods

This study used a quantitative, descriptive correlational design in order to examine and compare influences on physical activity in adolescent girls.

Setting

Travis County has 1,095,584 residents, with 23.7% of the population under age 18 (U.S. Census, 2013). The ethnic makeup of the county is 50.1% White, 33.8% Hispanic (mostly Mexican-American), 9% Black, 6.2% Asian/Pacific Islander, and 2.3% mixed race (U.S. Census, 2013).

The sample for this study was drawn from patients of The University of Texas at Austin Children's Wellness Center in Del Valle, Travis County, Texas. Del Valle, Texas is small rural town approximately 7 miles southeast of Austin. Del Valle is home to the Travis County Correctional Complex, and the Austin-Bergstrom International Airport. The population of Del Valle is approximately 16,756 (Best Places, 2010).

Participants were recruited through The University of Texas at Austin Children's Wellness Center (CWC), through clinic visits, vaccination fairs and sports physicals conducted by the CWC. The University of Texas at Austin Children's Wellness Center was created in partnership with the University of Texas at Austin School of Nursing and the Del Valle Independent School District (DVISD). It is now affiliated with CommUnity Care, a non-profit corporation that runs several (formerly government-run) community clinics for the medically underserved in the Austin, Texas area. It is the only pediatric clinic in Del Valle, and its clients are primarily Hispanic, low income, and medically underserved. One of the missions of the CWC is to facilitate nursing research

activities. Between August 2009 and April 2010, CWC served approximately 381 adolescent girls between the ages of 11-14. Ethnic makeup of Del Valle ISD is 11.9% Black, 7% White, 80.1% Hispanic, 0.3% Native American, and 0.8% Asian/Pacific Islander (Texas Tribune, 2012.). Of these students, 85% are classified as economically disadvantaged.

Sample

Study participants satisfied the following criteria: 11-14 years of age, female, English-speaking, free of any medical condition that prevents them from engaging in physical activity (per self-report), living within Central Texas, and willing and able to complete a survey. Although Hispanic girls were the focus of this study, data was collected from girls of other ethnicities for comparison analysis. Eligibility was determined by asking the participant and the participant's parent or guardian if they met the criteria discussed above.

In order to determine sample size, I conducted a power analysis using nQuery Advisor, version 7.0, which used formulas previously detailed by Gatsonis and Sampson (1989). For this power analysis, I used correlations between physical activity and BMI (r= -.23), body image (r= .37), and physical activity enjoyment (r= .49; p<.05; Davidson et al., 2007) three of the variables from a similar sample of adolescent girls. The r-values were used to create a R^2 values for the planned multiple regression analyses with 14 variables. This calculation resulted in R^2 values of .05, .14 and .24 for BMI, body image and physical activity enjoyment, respectively. Power was set at 80%, and p was set at .05. Suggested sample size ranged from 69 (for R^2 = .24) to 351 (for R^2= .05). A mid-range R^2 was chosen-- .14 to make a suggested sample size of 122.

Recruitment and Enrollment

CWC staff agreed to assist with recruitment, as well as provide an exam or consultation room for the participants to complete the survey on-site (M. Moran, personal communication, April 12, 2010). Female patients of the CWC who met the age requirements were invited to participate in the study by the primary researcher. During their clinic visit, adolescent girl patients of the CWC were offered the chance to complete the survey on-site, provided their legal guardian was present to sign a written consent. I provided parental consent forms in both English and Spanish, and the staff was available to interpret if Spanish-speaking parents had questions. Adolescent assent forms were also provided. Verbal and written consent and assent was obtained. The survey took on average 15-20 minutes to complete.

Data Collection Procedures

Participants completed the survey at the CWC during their clinic visit. Surveys were completed in the waiting room, the exam room, and sometimes outside the building. Height and weight were collected prior to survey completion, using the scales provided by the CWC (explained in further detail below).

Instruments

In order to determine body mass index, height and weight of participants were measured (in centimeters and kilograms) using a digital standing scale and height rod stadiometer. The University of Texas at Austin Children's Wellness Center used the Health o Meter PORTROD height rod and the Seca 769 High Capacity Digital Column Scale. The Health o Meter PORTROD Height Rod is a wall-mounted ruler with a horizontal level that is placed on top of the head of the participant, with a plastic bubble

to assure a level view of the demarcations, and a lock knob for measurement accuracy and safety. This wall-mounted device measures height in increments of 1/16th inch or 1 mm, with a height capacity of 83 inches. Participants were measured without shoes, with their head, shoulders, back and pelvis pressed against the wall, standing with straight posture for the most accurate possible measurement.

The Seca 769 High Capacity Digital Column Scale has a 440 pound (200 kg) capacity, and is able to measure to a 0.2 pound (0.1 kg) resolution. This scale has a tare button, allowing the operator to calibrate the scale before each weight is taken. Participants removed shoes and heavy coats or jackets before standing on the scale, and were instructed to stand still during the weighing process.

Height and weight data was used to determine Body Mass Index percentile using the CDC pediatric growth chart for females. Height and weight were not collected by self-report due to the inaccuracy of height and weight self-report among adolescents, particularly among those of Hispanic ethnicity (Goodman, Hinden & Khandelwal, 2000; Morrissey, Whetstone, Cummings & Owen, 2006).

Paper survey data was stored in a locked file cabinet, in my office. Identifiable data-- name, address, etc.-- was stored in a separate file cabinet from the survey data. Questionnaires were informally pilot-tested for usability before they were administered to participants. I was available during survey administration to answer participants' questions.

Data was collected using the following instruments: the Personal Characteristics Questionnaire, the Self-Administered Physical Activity Checklist (SAPAC), the Pubertal Development Scale (PDS), the Contour Drawing Rating Scale (CDRS), the Physical

Activity Enjoyment Scale, the Social Support for Exercise Survey (SSES), the Sociocultural Attitudes Toward Appearance Questionnaire, version 3 (SATAQ-3), and the Short Acculturation Scale for Hispanics--Youth (SASH-Y). The instruments were placed in this order because the 3DPAR required the most time to complete, the CDRS and PDS involved physical self-evaluation, and the last five used Likert-type response options. The instruments, and the variables they were intended to measure, will be discussed in greater detail below.

The Personal Characteristics Questionnaire.

I designed the demographic questionnaire to contain questions about age, grade, and the school attended. The "grade" and "school attended" questions were not in the model but were used to describe the sample and examine for potential confounding variables. This questionnaire measured personal characteristics.

The Self-Administered Physical Activity Checklist (SAPAC).

The SAPAC was a self-report measure of the outcome variable-- physical activity. The SAPAC measured physical activity type, duration and intensity (Sallis, Strikmiller, Harsha, Feldman, Ehlinger, Stone et al., 1996). Respondents were asked to report minutes of physical activity before, during, and after school physical activity, T.V./video watching, and computer games for one day. The SAPAC contained a list of physical activities such as *walking*, *basketball* or *outdoor chores*. The SAPAC was modified slightly from its originally published format (Sallis et al., 1996) for the PALI study.

I eliminated the "most" "some" "none" system for measuring physical activity intensity in order to simplify measurement. Instead, minutes of physical activity and metabolic equivalents were used categorize intensity. METs (Metabolic EquivalenTs),

were established by Ainsworth, Haskell, Leon, Jacobs, Montoye, Sallis and Paffenbarger (1993), and revised by Ainsworth, Haskell, Whitt, Irwin, Swartz, Strath, et al. (2000) to determine the standard intensity of each physical activity. METs are standardized scores representing the metabolic expenditure of a wide variety of physical activities, where 1 MET represents resting (such as sleeping or reclining). The Centers for Disease Control and Prevention and the American College of Sports Medicine define light physical activity as 1-3 METs, moderate physical activity as 3-6 METs, and vigorous physical activity as greater than 6 METs (Ainsworth et al., 2000).

Verbal instruction by the survey administrator, in the form of scripted instructions, helped the respondents to judge physical activity duration. Results of the survey were used to calculate intensity and amount of light, moderate or vigorous physical activity per day (in minutes).

I chose the one-day recall format of the SAPAC in order to reduce respondent burden, and also because one study found that a three-day recall format is too long to be accurate in adolescents (McMurray et al., 2004). The researchers developed this survey in a sample of 5th-grade male (n = 55) and female (n = 70) children from four regions of the United States: Louisiana (n = 60), Minnesota (n = 26), Texas (n = 24) and California (n = 15) as part of the Child and Adolescent Trial for Cardiovascular Health (CATCH) study (Sallis et al., 1996). The ethnic composition of the study was as follows: 47 African Americans, 52 White, 16 Hispanic, and 10 Asian/Pacific Islander (Sallis et al., 1996). The authors compared two forms of physical activity log-- the SAPAC and the Physical Activity Checklist Interview or PACI (Sallis et al., 1996). Both scales used the same form, but the interviewer completed the PACI, based on answers to questions from

respondents, whereas the respondents completed the SAPAC themselves. The physical activity results from the two physical activity checklists were compared with the physical activity results of a Caltrac accelerometer. The Caltrac accelerometer is a motion detector about the size and weight of a small pocket calculator, which is worn on the waist to measure physical activity by detecting motion. The use of accelerometers to measure physical activity is a much studied and widely respected method of objective physical activity measurement (Sallis et al., 1996).

The authors found that respondents reported more physical activities and greater minutes of physical activities (approximately 25% difference) on the SAPAC than on the PACI, but intraclass correlation showed that there was sufficient similarity between the two methods (t = .65-.75; Sallis et al., 1996). Furthermore, SAPAC minutes of physical activity and intensity of physical activity (in METs) was significantly correlated with accelerometer-measured minutes of physical activity ($r = .51, p < .05$) and intensity of physical activity ($r = .53, p < .05$; Sallis et al., 1996).

The SAPAC was published in its original form by the authors (Sallis et al., 1996). I obtained permission to modify the SAPAC for the use of this study from the instrument's authors.

The Pubertal Development Scale (PDS).

The Pubertal Development Scale was a measure of pubertal stage. Petersen, Crockett, Richards & Boxer (1988) originally developed this scale as an alternative to or a visual analog scale based on Tanner staging, which required children to look at pictures of genitalia and breasts to self-rate their developmental stage (Morris & Udry, 1980). This method was developed due to the apparently widespread issue of parent and school

objections to using drawings of genitalia for school-based studies (Brooks-Gunn, Warren, Rosso & Gargioulo, 1987).

The 6-item PDS measures self-reported visible signs of pubertal development--growth spurt, body hair growth, skin changes (e.g. acne), breast growth, and menstruation. Responses are on a 1-4 scale, with 1 "*has not yet begun*" representing pre-puberty, and 4 "seems completed" representing the completion of puberty. The scale used in this study be a combination of two versions of the PDS-- using the "*I don't know*" a response option added by Carskadon & Acebo (1993), but will retain the question Carskadon & Acebo excluded, "*Do you think your development is any earlier or later than most other girls your age?*" (Petersen et al.). Scores on items are summed to create a single pubertal development score.

Petersen et al. (1988), in a sample of 253 male and female students in grades 6-8 (mean age 11.5 years for grade 6), found the PDS had good internal consistency (α = .68-.83, mean α = .77). Carskadon & Acebo (1993), in their sample of 323 boys and 375 girls in grades 4, 5 and 6, from 61 U.S. schools, found the PDS had good internal consistency (α = 0.67-0.70).

The PDS was highly correlated (r = 0.868-0.841, $p < 0.001$) with physician-rated physical development, as established by Tanner (1962) in a sample of 17 adolescent girls aged 10-16 years (Carskadon & Acebo, 1993). Shirtcliff, Dahl & Pollak (2009) found PDS stage predicted hormonal markers for puberty-- testosterone (β =. 41, $p < .01$, R^2 = .15) DHEA (β = 0.52, $p < .01$, R^2 = .14) and Estradiol (β = .39, $p < .01$, R^2 = .27) in a sample of 78 early adolescent girls (M = 11.2 years of age; 48% White, 26% Black, 26% Asian, Hispanic or mixed race; Shirtcliff et al., 2009). However, Shirtcliff et al. also

found a slightly weaker relationship between the PDS and the physician-rated physical development (r = .65-.71, p < .001). Bond et al. (2006), in a sample of 2,864 American (Washington State, 20%) and Australian (Victoria, 80%) boys (48%) and girls (52%) 9-16 years of age girls, found moderate agreement (K = 0.57, 95% CI = 0.53, 0.61) between the PDS and a Tanner-based self-assessment, the Sexual Maturation Scale.

Shirtcliff et al. (2009) found that adolescents who were behind their peers in pubertal development were more likely to overestimate their pubertal stage, e.g. stage qualified the effect of age (β = .32, p < .003 for age; β = -.68, p < .001 for stage). Multiple researchers found that girls tended to overestimate their breast growth stage (Carskadon & Acebo, 1993, Petersen et al., 1988, Shirtcliff et al., 2009). Usage of this scale is free for non-profit researchers. Carskadon & Acebo (1993) published a copy of the survey.

The Contour Drawing Rating Scale (CDRS).

The CDRS measures body image in this study. This scale consists of a series of 17 female figure diagrams, depicting a range of body sizes, from very underweight to very overweight (Wertheim, Paxton & Tilgner, 2004). Respondents are asked to select their current body size, and the size they wish to be. The difference between the first response and the second response will be compared in order to discover the adolescent girls' degree of satisfaction with her body. This calculation results in three items--current (current body size), ideal (ideal body size), and current-ideal (the difference between current and ideal). For this study, only the current-ideal score will be used, in order to examine for body image issues.

The CDRS was administered to a sample of 1067 girls grades 7 (n = 562) and 8 (n = 494) from 12 Australian schools (Wertheim et al., 2004). The scale demonstrated good test-retest reliability over the four time periods it was administered (r = .84, .83, .77, p < .05; Wertheim et al., 2004). Convergent validity was evidenced by a large correlation between Time 1 current figure rating and BMI (r = .69, p < .05; Wertheim et al., 2004). Discriminant validity was evidenced by very low correlation between the three Time 1 CDRS categories-- current (r = -0.07, p = .05), ideal (r = 0.08, p = .03), and current-ideal (r = -0.15, p < .05)-- and a measure of social desirability. I obtained permission to use this scale from the primary author.

The Physical Activity Enjoyment Scale (PACES).

The PACES measured enjoyment of physical activity. Originally developed by Kendzierski and DeCarlo (1991) for adults, the authors derived items for the PACES from physical activity enjoyment literature, discussion among experts, interviews of 16 adults with varying attitudes about physical activity, and examination of dictionary and thesaurus entries. The authors then checked the resulting 39 items via content analysis by three experts in the field of exercise adherence. Though they did not calculate content validity index, the authors used a similar rater scoring system. Expert raters ranked each item on a scale of 1 (*definitely think this item should not be included*) to 7 (*definitely think this item should be included*). Experts gave each of the 39 items an average rating of 5 to 7 (S.D.= 0 to .82). Though the researchers did not specifically explain how they made this decision, 16 items were chosen from the original 39. Additionally, three items were added based on the suggestions of the experts, bringing the total to 19 items in the completed scale (Kendzierski & DeCarlo).

Except for one item, which was dropped from the scale, the adult PACES was found to be internally consistent in a study of 30 college students (16 female, 14 male; Cronbach's α= .91), and another of 33 college students (8 female, 25 male; α = .93). Both the first (r = .35-.89) and the second (r = .45-.87) study had adequate item-total correlations. The scale also had strong 1-week test-retest reliability (r = .83). Proposing that boredom was the opposite of enjoyment, the researchers examined the correlation between enjoyment and boredom (measured by the Boredom Proneness Scale). They found that enjoyment was negatively correlated with boredom (r = -0.30, p < .05), thus demonstrating discriminant validity of the scale (Kendzierski et al.).

For the PALI Study, I used the version of the PACES developed by Motl et al. (2000) for adolescents. This version contained 22 items; modified from the adult version based on feedback from focus groups of 8th and 9th grade African-American and Caucasian girls. Items asked respondents to rate their beliefs about the consequences of being physically active, by choosing positive or negative responses in response to belief statements. For example, one item stated, "When I am active, I find it fun" with the following five response choices: *1 = disagree a lot, 2 = disagree a little, 3 = neither agree nor disagree, 4 = agree a little, and 5 = agree a lot* (Motl et al.).

Validity and reliability were examined in two samples of Black and White girls (N = 955 and N = 1,797 respectively) in eighth grade from 24 schools in South Carolina (Motl et al., 2001). Follow-up testing was conducted a year later, when the same sample was in the ninth grade. The scale had good internal consistency (α =.87). The authors performed structural equation modeling, exploratory factor analysis, and confirmatory factor analysis to measure factorial validity of the scale (Motl et al.). The model

generated four factors: *enjoyment*, *factors influencing enjoyment of physical education*, *physical activity*, and *sport involvement* (Motl. et al). The authors included factors influencing enjoyment of physical education, physical activity, and sport involvement in the model because research suggested they were related to physical activity enjoyment. The model was a good fit with physical activity enjoyment ($\chi^2 = 1769.57$, $df = 451$, $RMSEA = 0.040$ [$90\%\ CI = 0.038–0.042$], $RNI = 0.93$, $NNFI = 0.92$). Therefore, the authors concluded model was conceptually accurate, and possessed construct validity. I obtained usage permission, along with copies of the scale, from the authors. A copy of this instrument was available in Spanish.

The Social Support for Exercise Survey (SSES).

The SSES measured interpersonal influences on physical activity. Sallis, Gossman, Pinski, Patterson and Nader (1987) originally developed this survey for adults, but Dishman, Dunn, Sallis, Vandenberg and Pratt (2010) and Prochaska, Rodgers, and Sallis (2002) have since used it for middle-school-aged girls. The SSES is a subscale of the Social Support Survey for Diet and Exercise Behaviors (Sallis et al., 1987). For each question, the respondent selected how often their family and friends did a variety of supportive or non-supportive behaviors in the past three months. Responses were on a 5-point Likert-type scale from *1-none* to *5-often,* and *6-does not apply*. Behavioral statements included five encouragement items, such as [in the past three months, my family or friends] "Offered to exercise with me," and two discouragement items, such as "Criticized me or made fun of me for exercising." Additionally, there were five participation items, such as "Planned for exercise on recreational outings" and one rewards item "Gave me rewards for exercising (Sallis et al., 1987)." Though the original

SSES had 13 items, for this study, there were 26 items (See Appendix B). In the original version, the respondents needed to select (for each question) whether they were responding for family or friends, and then the response from none to often. In order to reduce confusion, I separated them into questions about family and questions about friends.

Sallis et al. (1987) tested the original survey was tested on two samples. Sample 1 was a representative sample of adults younger than age 45 (mean age=36 yrs., SD=7), 10 Black, 10 Hispanic, and 10 White (Sallis et al., 1987). Sample 2 had 171 participants (154 undergraduates, 17 health promotion research staff members; mean age 21.3 yrs., SD=6.5). The sample was 90% White. The authors then re-administered the test to a subsample of 52 students 1-2 weeks later (Sallis et al., 1987).

Test-retest reliability for the SSES was good to excellent ($r = 0.55\text{-}0.86, p < 0.001$). Internal consistency was also adequate for survey items ($\alpha = 0.61\text{-}0.91, p < 0.001$). Exercise variables were unrelated to eating variables ($F = 1.09\text{-}3.36$, *one-way*, $p > .05$) as well as a measure of smoking status ($F = 0.54\text{-}2.82$, *one-way*, $p > .05$; Sallis et al., 1987). The authors determined validity via criterion-related validity, and construct validity. The SSES was significantly correlated with a measure of vigorous exercise ($r = 0.23\text{-}0.46, p < .01$). The factors of the SSES were not significantly correlated with the quality or quantity indexes of Sarason's Social Support Questionnaire. Additionally, the questionnaire was not significantly correlated with exercise habits (Sallis et al., 1987). Factor analysis revealed two subscales-- Family Support for Exercise and Friend Support for Exercise. The authors eliminated two items (reward and punishment items) due to eigenvalues greater than 2.0. The Support for Exercise Scale accounted for 59% of the

variance in the model. The final version of the SSES includes the Family Support for Exercise and the Friend Support for Exercise subscales. Dishman, Hales, Sallis, Saunders, Dunn, Bedimo-Rung, & Ring (2010) examined factorial validity in the Trial of Activity for Adolescent Girls (TAAG) study of 4,885 adolescent girls in grades 6-8 (21.0% Hispanic, 45.8% White, 22.2% Black, 4.6% Asian, and 6.1% multiracial) from six geographically diverse areas in the U.S. Factorial validity was examined using confirmatory factor analysis (CFA). The authors found the CFA model for social support to be a good overall fit for both the friend and the family subscales, for 6th and 8th grade girls, and an acceptable fit for Hispanic girls in both grades [$CFI > 0.95$, $NNFI > 0.92$, $FMSEA \leq .08$, $SRMR < 0.05$). Thus, the SSES seems to be a reliable measure of interpersonal influences for physical activity in adolescent girls. I obtained permission to use this scale from the authors. The SSES was also available in Spanish.

The Sociocultural Attitudes Toward Appearance Questionnaire 3 (SATAQ-3).

The SATAQ-3 measured sociocultural influences, specifically, thin ideal internalization, pressures to be thin, and appearance-related media messages. Originally developed for adult women (Thompson, van den Berg, Roehrig, Guarda & Heinberg, 2004), the SATAQ-3 has since been used with adolescent girls in several studies (Abrams & Stormer, 2002; Clay, Vignoles & Dittmar, 2005; Knauss, Paxton & Alsaker, 2009; Smolak, Levine & Thompson, 2001). The SATAQ-3 had 30 items, with four subscales: Internalization-General (thin ideal internalization), Internalization-Athlete (athlete-specific thin ideal internalization), Pressures (to be thin), and Information (appearance-related media messages); Thompson et al, 2004). Each item contained a statement, such as "I compare my appearance to the appearance of TV and movie stars." Response

choices were on a Likert-type scale, and ranged from 1 (definitely disagree) to 5 (definitely agree). A higher score indicated higher internalization/pressures/information. For the PALI study, I used the Internalization-General, Pressures, and Information subscales to measure thin ideal internalization, pressures to be thin, and appearance-related media messages. The Internalization-Athlete subscale was designed for use by student athletes, and was not vital to answering the research questions, so I eliminated it from the survey to reduce item burden on participants.

Validity for the SATAQ-3 was supported through exploratory factor analysis of the original 60-item version (Thompson et al., 2004). Items that were cross-loaded, or had low factor loadings were eliminated, reducing the total items to 30. The revised model accounted for 65% of the variance in the SATAQ-3. Exploratory factor analysis of the SATAQ-3 demonstrated discriminatory validity-- there was no common factor loading between the SATAQ-3 and the Ideal Body Internalization Scale--Revised (IBIS-R). The IBIS-R measured awareness of appearance norms (a different but similar concept), whereas the SATAQ-3 measured awareness of thin ideal internalization, pressures to be thin, and appearance-related media messages. The SATAQ-3 had good convergent validity with the Eating Disorders Inventory (EDI), which measured body image (Body Dissatisfaction subscale, EDI-BD) and eating disturbance (Drive for Thinness subscale, EDI-DT; Thompson et al., 2004). The aforementioned subscales had moderate correlation or higher (r = .32-.58, p < .01). A few correlations were smaller in the first study, specifically those between the EDI-BD subscale and the Internalization (r=.17, p<.05) and Information (r=.19, p<.05) subscales (Thompson et al., 2004). However, correlations between these subscales in the second study were higher for the

Internalization (r = .31) and Information subscales (r = .22). There was a slight difference in sample size and age range in Study 1 (n = 175, 17-25 years of age) versus Study 2 (n = 195, 18-22 years of age). However, participants from both studies were female undergraduates at the University of South Florida. Franko, Jenkins, Roehrig, Luce, Crowther and Rogers (2012) examined test-retest reliability, construct validity and convergent validity in their study of 173 Hispanic and 129 White female undergraduates (M = 19.8, SD = 2.0). The authors found good reliability, and good to adequate test-retest reliability on all the SATAQ-3 subscales for Hispanic women (α = .89 - .96, ICC = .78 - .96, $p < .001$). Convergent validity tests had mixed results—the authors found no significant correlations between the SATAQ-3 Information and Internalization-Athlete subscales and the Body Esteem Scale (Mendelson, Mendelson & White, 2001), a similar scale that measures body self-evaluation. All other subscales were significant ($p < .05$). Convergent validity was tested using CFA, and the authors found the SATAQ-3 models had an excellent fit [GFI = 0.99, CFI = 1.00, RMSEA = 0.00]. The SATAQ-3 is free and publicly available for non-profit researchers. I retrieved a copy of the survey online. The SATAQ-3 did not have a Spanish version and needed to be translated.

The Short Acculturation Scale for Hispanics-- Youth (SASH-Y).

The SASH-Y measured acculturation in this study. The SASH-Y consisted of 12 items designed to examine cultural behaviors in multiple contexts-- family, social and media influences (Barona & Miller, 1994). Items included questions such as "In what languages do you usually think?" Responses ranged on a 5-point Likert-type scale, and were different for each question. For example, the response choices for the previous statement included (1) only Spanish, (2) more Spanish than English, (3) both equally, (4)

more English than Spanish, (5) only English (Barona & Miller). Higher scores indicated higher acculturation to U.S. society. For this study, the total score was used to measure cultural influences in the R-PALM.

The SASH-Y was tested in a sample of 141 Hispanic and 230 non-Hispanic White children and adolescents grades 5-8 (mean age 13.2 years) in Tempe, Arizona. The authors found the SASH-Y had strong internal consistency in the total sample (α = .94) and in the Hispanic sample (α = .92; Barona & Miller, 1994). Split-half reliability was strong for the total sample (α = .96) and for the Hispanic sample (α = .95; Barona & Miller). Exploratory factor analysis suggested a three-factor model. Factor 1 (language preference alone or outside family context, e.g. Extrafamilial Language Use) accounted for 80.5% of the explained variance in the model, Factor 2 (language use within family, e.g. Familial Language Use) accounted for 11.6% of the explained variance, and Factor 3 (ethnic preferences in social relations, e.g. Ethnic Social Relations) accounted for 7.9% of the explained variance in the model. Factors 1 and 2 had the highest intercorrelation (ϕ = .67).

Serrano and Anderson (2003), in their study of 137 Hispanic and non-Hispanic White children grades 4 and 5 (mean age 10.5 years) in rural Colorado also found a strong internal consistency (α = .89) and split-half reliability (α = .84) for the SASH-Y. The authors determined test-retest reliability in a small sub-sample (n = 12) who completed the SASH-Y two weeks apart. There was a 70.8% agreement of scores between the two time periods. The authors demonstrated criterion validity by administering the SASH-Y to parents and children in two separate samples. Exploratory factor analysis found that, consistent with Barona and Miller (1994), personal language

use was the strongest determinant of acculturation, explaining 82.6% of the variance in the model. This scale was freely available for non-profit researchers. The SASH-Y was published in Barona and Miller (1994). All scales can be found in Appendix B.

Data Analysis

I analyzed all data using SPSS, version 20. After the data was collected and entered, I reviewed all cases to check for impossible, missing or inconsistent values. Before the data was analyzed, I computed frequencies, standard deviations, mean, median and mode for each research question. I inspected the results for deviations in normality, outliers and missing values. I examined the outliers for demographic differences using one-way ANOVA. I then used one-way ANOVA to compare personal characteristics of participants who completed the survey with partial or non-completers in order to ensure that no significant difference existed between those two groups (Burns & Grove, 1999). When necessary, I removed extreme outliers (z-score > 3.29) to normalize the mean. I calculated t-tests to determine whether Hispanic and White girls differed significantly on any demographic characteristics (e.g. mean age, weight, height, etc.). I examined the individual instruments for internal consistency. I conducted all statistical tests at an alpha level set at 0.05.

Statistical Plan for Each Research Question and Hypothesis.

I calculated descriptive statistics (mean, standard deviation, maximum and minimum range) for each variable in order to summarize the information and describe the sample. I then individually examined variables for normal distribution, skewness, kurtosis, and outliers using histograms, scatterplots, z-score transformation, and Q-Q plots.

RQ1. How do personal characteristics (age, pubertal stage, BMI and ethnicity) influence physical activity in adolescent girls?

H1. Physical activity is expected to be negatively associated with pubertal stage (as defined by Tanner) and age amongst adolescent girls-- e.g. older and more physically mature participants will be less physically active.

H2. Controlling for age, BMI, ethnicity and pubertal stage, Hispanic adolescent girls will have lower physical activity than White girls.

I had planned to use multiple linear regression and bivariate correlation (with variables simultaneously entered) to determine the relative contribution of age, BMI, puberty stage and ethnicity to physical activity in Hispanic and White girls. However, as will be explained later, there was an insufficient sample of White girls, so this hypothesis was not tested.

RQ2. How do perceptual influences (physical activity enjoyment and body image) impact physical activity in adolescent girls?

H3. Physical activity enjoyment and body image will be positively associated with physical activity.

I performed multiple linear regression analysis to examine the influence of physical activity enjoyment and body image on physical activity. I entered physical activity enjoyment and body image simultaneously into the model.

H4. Enjoyment of physical activity and body image will be negatively associated with BMI.

I performed multiple linear regression to determine the relative contribution of BMI to body image and physical activity enjoyment. I entered physical activity enjoyment and body image simultaneously into the model.

RQ3. How do interpersonal influences (family and friends) impact physical activity in Hispanic adolescent females?

H5. Support for physical activity by family and friends will be positively associated with physical activity in adolescent girls.

I performed multiple linear regression analysis to examine the influence of family members and friends on physical activity in White and Hispanic adolescent girls, with family members and friends entered simultaneously into the model.

RQ4. How do sociocultural influences (culture, society and media) impact physical activity in adolescent girls?

H6. Thin ideal internalization, pressures to be thin, and appearance-related media messages will be negatively related to physical activity.

I performed multiple linear regression analyses to determine the influence of internalization of the thin ideal, appearance-related media messages and pressures to be thin on physical activity in White and Hispanic adolescent girls, with all three dependent variables entered simultaneously into the model.

H7. Acculturation moderates the relationship between appearance-related media messages and physical activity.

I performed multiple regression analyses to determine if acculturation (total SASH-Y score) moderated the relationship between sociocultural influences (Total SATAQ score) and physical activity (3D PAR, average minutes per day). Following Bennet (2000), the steps of analysis were: 1.) enter acculturation as one of the independent variables, 2.) enter the interaction term [the product of total SATAQ score and total SASH-Y score, which represents the moderator effect], 3.) if the interaction term explains a statistically significant amount ($p<.05$) of variance in physical activity then acculturation has a moderator effect.

H8. Acculturation will be negatively associated with body image in Hispanic adolescent girls.

I performed Pearson correlation and linear regression to examine the strength of the relationship between acculturation and body image in Hispanic adolescent girls.

RQ5. How do personal characteristics, perceptual influences, interpersonal influences and sociocultural influences combine to affect physical activity?

I performed multiple regression with all independent variables (personal characteristics, perceptual influences, interpersonal influences, and sociocultural influences) entered simultaneously into the model.

Human Subjects Consideration

Before initiating the study, approval was obtained from the Institutional Review Board of the University of Texas at Austin. Prior to recruitment, approval was obtained from CWC's supervisory corporation, CommUnity Care. Written consent was obtained from the participants' parents, and written and verbal assent was obtained from the participants. Consent forms were written in both English and Spanish, at a 6th grade reading level. This study did not involve any invasive tests and the risk posed to participants was no greater than the risks posed by everyday life. As compensation for time spent to completing the survey, participants were entered into a raffle to win one of three iPod Nanos.

In order to protect privacy of personal information, participants had height and weight measured individually, out of view of the other clinic patients, and participants were asked not to share their responses with other participants. To protect confidentiality, participant names were kept separate from survey data. Only an ID number identified participant cases. I kept a list linking participant names to identification numbers in a locked file, to which I had access. Participants were informed that if they wished to withdraw participation at any time they were free to do so. Participants were also informed that if they did discontinue participation in this study, it would in no way affect their standing with the University of Texas at Austin, or The University of Texas at Austin Children's Wellness Center.

Chapter 4: Results

Introduction

In this chapter, I will present the results of the Physical Activity Lifestyle Influences (PALI) study. Recruitment and enrollment outcomes are reported, then demographic statistics for the sample and the variables of interest. Thereafter, correlations among the variables of interest are reported. Finally, the results of hypothesis and research question testing are reported.

Recruitment and Enrollment

Participants were enrolled from immunization clinics and sports physicals held at The University of Texas at Austin Children's Wellness Center from June through August in 2011 and 2012. Nine potential participants who were recruited for the study were not included in the final sample. One completed survey was not included in the analysis because the assent form was not signed. Another survey was excluded because the consent form was not signed. In both cases, attempts were made to contact the participant's family to get them to sign the forms, but these attempts were unsuccessful. Five participants chose not to complete the survey due to competing time commitments. Two more participants failed to complete the survey, but did not give a reason for withdrawing from the study. For the most part, participants completed the surveys on-site, although in rare cases participants were allowed to take surveys home. Of the seven participants who chose to complete their surveys at home, three returned their completed surveys to The University of Texas at Austin Children's Wellness Center. The other four did not return their survey. Of all the potential participants approached to join the study, only two reported they did not speak any English. In total, 121 participants were

included in the final analysis. Height and weight data was lost for 15 participants, so BMI data were available for only 108 participants.

Demographic Characteristics of the Sample

The sample for this study consisted of 106 Hispanic, 12 White, and 3 girls that identified as multiethnic ($N = 121$) between 11-14 years of age. Mean age was 12.4 years ($SD = 1.04$). Current grade level in school ranged from 5th to 10th grade ($M = 7.32$, $SD = 1.13$). White, Hispanic, and mixed race girls did not differ significantly in age, grade, school attended, or BMI percentile.

Table 2

Analysis of Variance (ANOVA) to Examine for Differences by Ethnicity

		Sum of Squares	df	Mean Square	F	Sig.
Age in years	Between Groups	3.921	2	1.961	1.837	.164
	Within Groups	124.879	117	1.067		
	Total	128.800	119			
Grade level in school	Between Groups	1.871	2	.936	.729	.484
	Within Groups	150.095	117	1.283		
	Total	151.967	119			
Schools coded into numbers	Between Groups	37.180	2	18.590	.660	.519
	Within Groups	3293.812	117	28.152		
	Total	3330.992	119			
BMI percentile	Between Groups	281.363	2	140.682	.226	.798
	Within Groups	62299.058	100	622.991		
	Total	62580.421	102			

Study participants averaged 69 minutes of physical activity per 1-day recall, with great variation (*SD* = 46.01, *Mdn* = 70 min). Due to a moderate amount of skewness, I transformed physical activity using a square root calculation (see Figure 3 and Figure 4). This resulted in a slightly more even distribution, making it suitable for multiple regression analysis. The most popular physical activity reported by participants was walking, followed by indoor chores.

Table 3

List of Reported Physical Activities

Physical Activity	No. Of Times Listed
Running, walking, or biking	*********
Bicycling	12
Walking	53
Running	31
Mixed walking/running	34
Chores	*********
Outdoor chores: mowing, raking, gardening, etc.	8
Indoor chores: mopping, vacuuming, sweeping, etc.	47
Exercises	*********
Swimming laps	8
Exercise: push-ups, sit-ups, jumping jacks, etc.	21
Sports	*********
Gymnastics: bars, beams, tumbling, trampoline, etc.	14
Basketball	10
Baseball/Softball	7
Football	3
Soccer	13
Volleyball	14
Martial arts: karate, kickboxing, etc.	2
Racket sports: badminton, tennis, etc.	2
Play	*********
Ball playing: four square, dodge ball, kickball, etc.	6
Games: chase, tag, hopscotch, etc.	14
Outdoor play: climbing trees, hide and seek	11
Water play: (swimming pool, ocean, or lake)	20
Jump rope	5
School Activities	*********
Marching band, flagline, or drill team	8
PE class	8

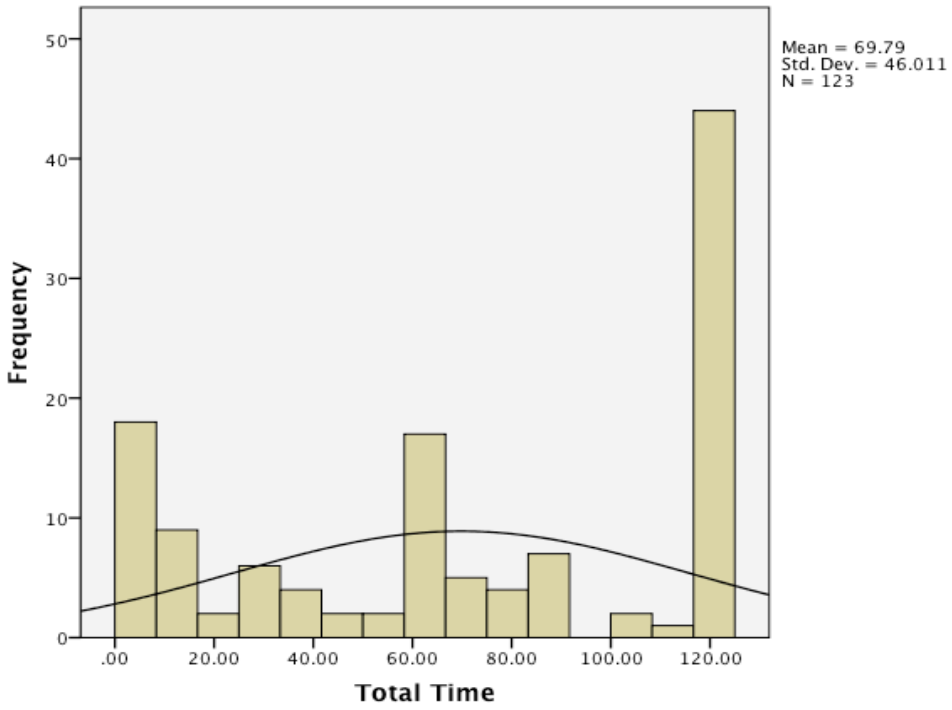


Figure 3. Total Physical Activity Time (in minutes), Prior To Transformation

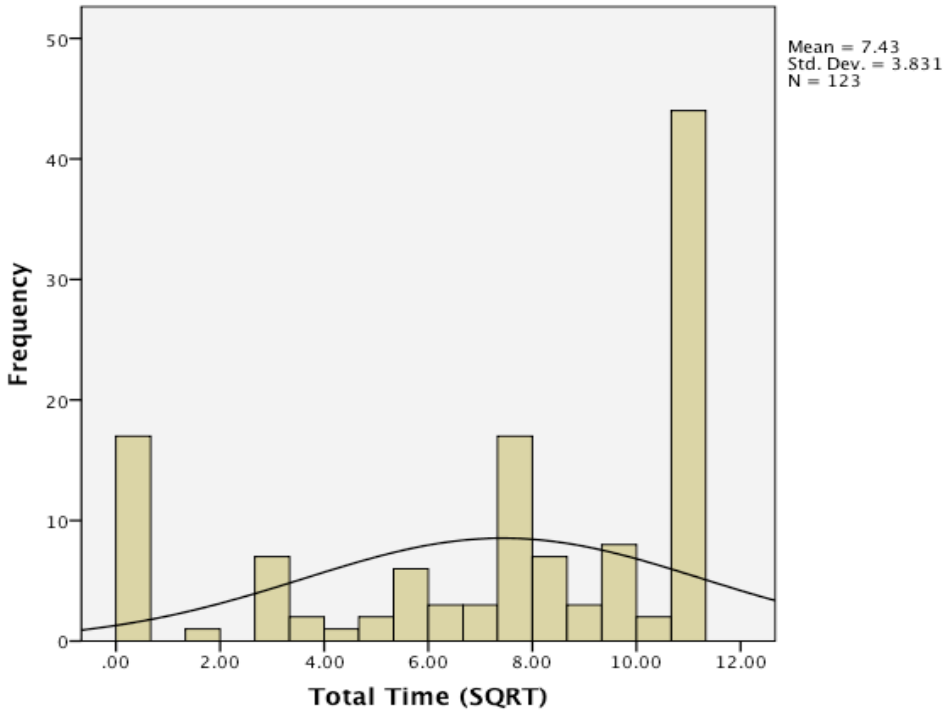


Figure 4. Total Physical Activity Time (in minutes), Transformed by Square Root

Table 4

Popular TV Shows Listed by Participants

TV Show	Frequency
Victorious	13
iCarly	9
Goodluck Charlie	8
Disney Channel	8
Cartoons	7
Wizards of Waverly Place	7
Telenovelas	6
Spongebob	6
How I Met Your Mother	6
MTV	6
Jersey Shore	5
Shake it up	4
Family Guy	4
Degrassi	3
106 and Park (music videos)	3
What not to wear	3
Friends	3
Sports	3
George Lopez	3
Teen Wolf	3
Wild Kratts	3
MTV3	3

Participants were asked which TV shows and which magazines they read most often (every day or nearly every day). The most popular TV show listed was Victorious, a Nickelodeon situational comedy starring Victoria Justice, a young Puerto Rican actress. The second most popular was iCarly, a Disney Channel situational comedy starring Miranda Cosgrove, an actress of Italian and Filipino descent. See Table 4. The majority (95%) of participants wrote that they did not read magazines.

Participants watched television an average of 1.79 hours per day (*SD* = 1.779). The majority of participants (48.8%) reported watching 1-3 hours of television, and within this group, 23.6% of the sample watched only one hour. The next largest group (21.1%) was those who reported watching no television. Those who watched less than

one hour made up 11.4% of the sample, and those who watched 3.5 to 5.5 hours on the 1-day recall made up 14.6% of the sample. Finally, 4.1% of participants reported watching 6-8 hours of television. See Figure 5.

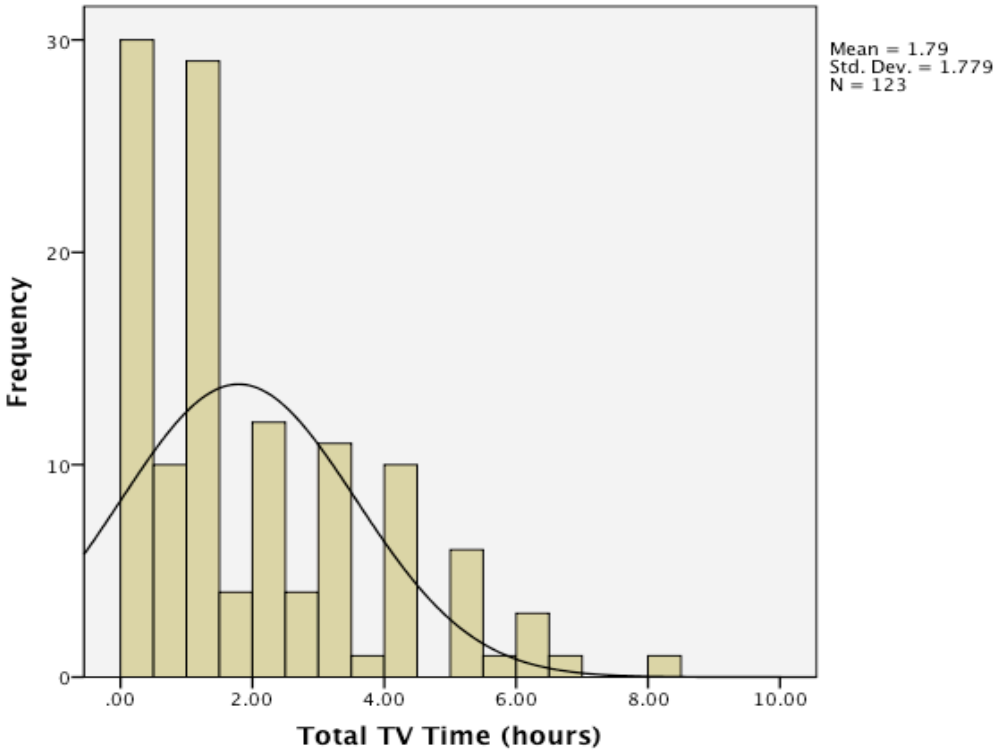


Figure 5. Total Television Watching Time (hours)

Participants played video or computer games an average of 0.7 hours per 1-day recall (*SD* = 4.29). Video game and computer use was low in this sample, as 61.2% reported no use at all. Nearly fifteen percent (14.9%) reported less than one hour, and 18.2% reported 1-3 hours of computer and/or video game use. There was a small section of the sample (5.8%) that reported 3.5 to 8 hours of computer or video game use. See Figure 6. Average BMI percentile was 75.09 (*Mdn* = 83.1, *SD* = 24.76), and was skewed toward a higher BMI. See Figure 7.

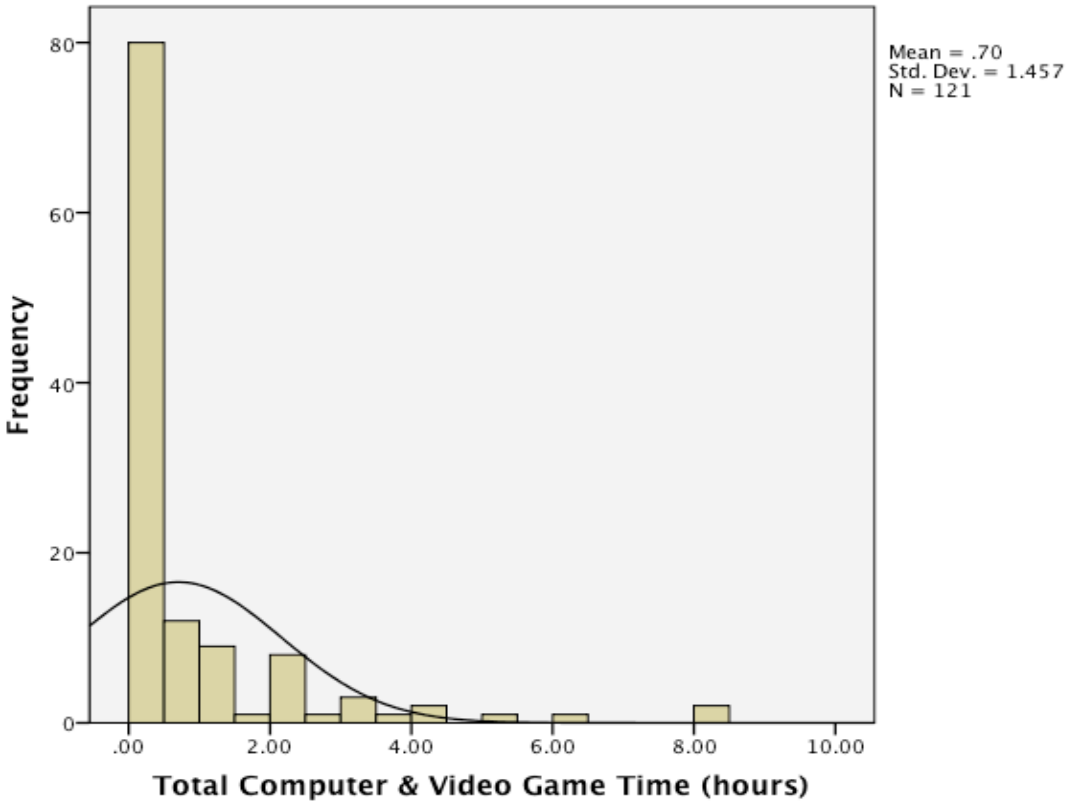


Figure 6. Total Video Game and Computer Time (hours)

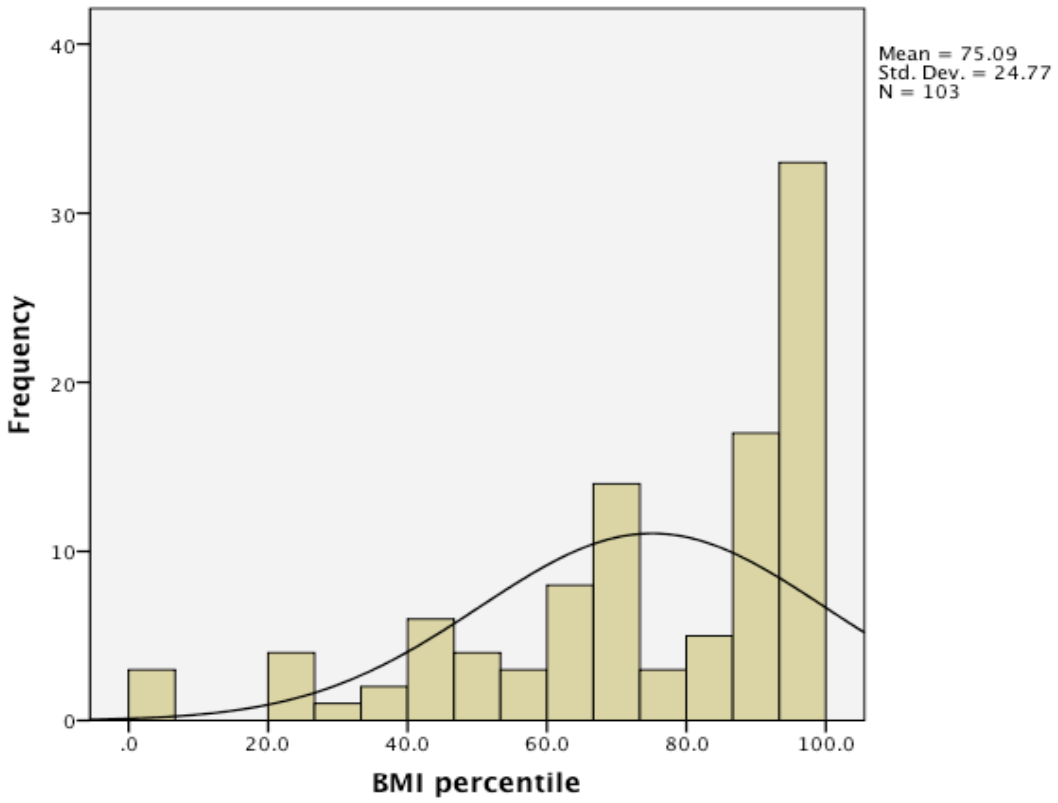


Figure 7. Body Mass Index Percentile (Per CDC BMI-for-age Chart for Females)

Descriptive Statistics for Variables of Interest

The average score on the Pubertal Development Scale was 12.76 (*SD* = 4.181), indicating that the majority of participants were postpubertal (a score greater than 8 indicates post-puberty). Mean age at menarche was 11.13 years (*SD* = 1.621) and the majority (76.9%) of participants were postmenarchal. Approximately one quarter of participants were ranked as either overweight (23.3%; *n*=24) or obese (26.2%; *n*=27), meaning that nearly half (49.5%) of the sample ranked above the 85th percentile on the Body Mass Index measure. See Table 5.

Table 5

Descriptive Data of Sample

		n	%	Mean	S.D.
Variable					
Age (yrs.)				12.40	1.040
	11	25	20.8		
	12	47	39.2		
	13	23	19.2		
	14	25	20.8		
Grade				7.32	1.130
	5	5	4.2		
	6	22	18.3		
	7	48	40.0		
	8	21	17.5		
	9	23	19.2		
	10	1	.8		
Ethnicity				2.851	.691
	White	12	9.9		
	Hispanic	106	87.6		
	Mixed Race	3	2.5		
BMI %ile				75.086	24.769
	<85th %ile	52	50.5		
	85th-94th %ile	23	23.3		
	>95th %ile	28	26.2		

The average score on the Contour Drawing Rating Scale (the measure of body image) was 1.67 (*SD* = 3.36), meaning that participants wanted to be approximately 1-2 sizes smaller than they were at the time of data collection. Approximately 25% of participants wished to be a larger size than their current body size. See Figure 8.

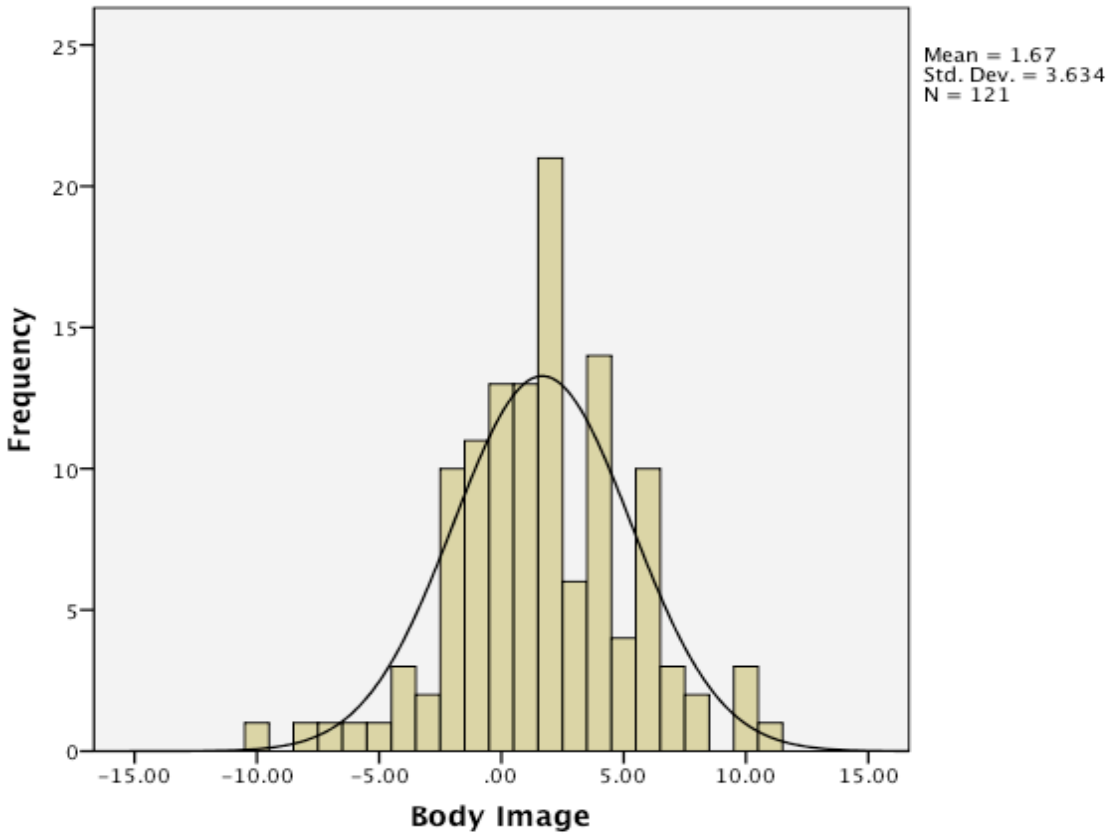


Figure 8. Body Image (Difference Between Ideal and Current Body Size)

Note. Negative numbers represent wanting to be a larger size than current size, and positive numbers represent wanting to be a smaller size than current size.

Participants in this sample were fairly highly acculturated, averaging 40.36 out of a possible 55-point maximum on the Short Acculturation Scale for Hispanics-Youth (SASH-Y) score. There was, however, a wide variation in scores (*SD* = 10.12). The SASH-Y had good reliability for this sample (α = .894).

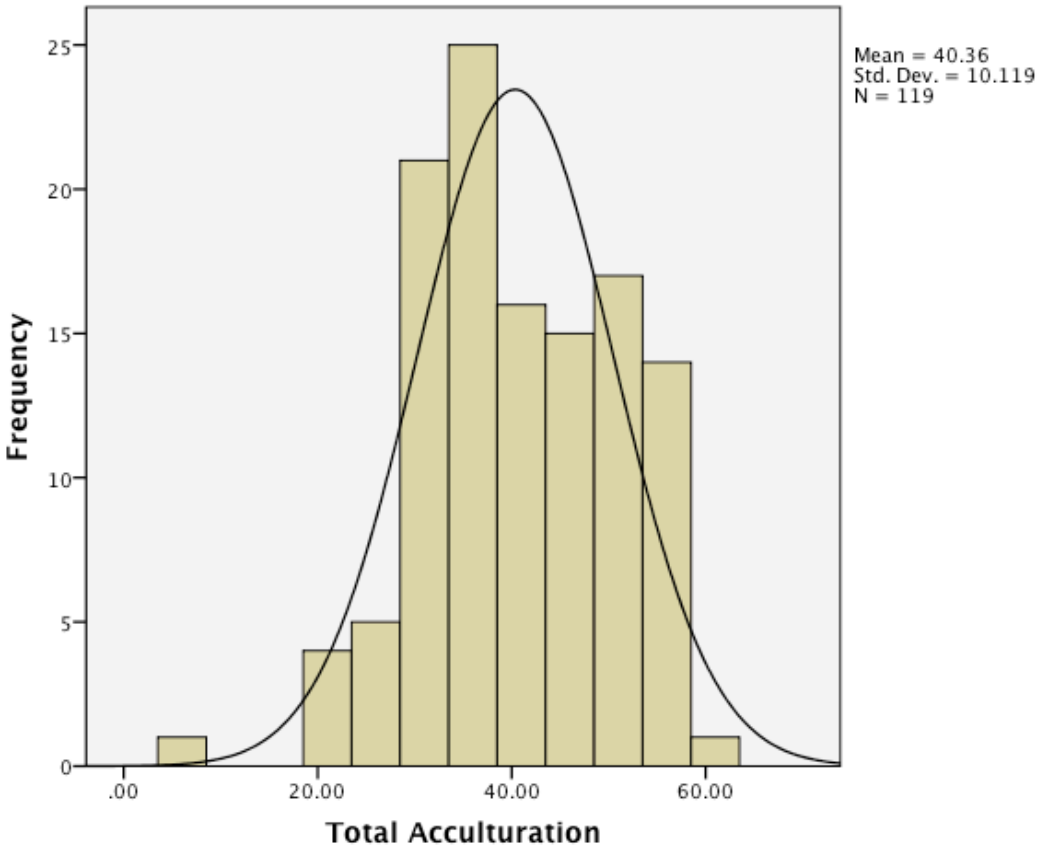


Figure 9. Acculturation

Physical activity enjoyment was generally high-- a mean of 64.88 out of a possible 80 points, but with wide variation (*SD* = 12.79). The physical activity enjoyment scale had questionable reliability for this sample (α = .688). Study participants reported low to moderate media influence. Average thin ideal internalization was 23.55 (*SD* = 8.26; *Max* = 45), pressures to be thin were 17.88 (*SD* = 7.37; *Max* = 30), and appearance-related media messages were 23.90 (*SD* = 7.00; *Max* = 45). Although the total media influence (SATAQ) scale had good reliability for this sample (α = .858), the subscales did not. The pressures to be thin subscale had acceptable reliability (α = .737),

while the thin-ideal internalization (α = .644) and appearance-related media information (α = .606) subscales had questionable reliability for this sample.

Family social support for physical activity was higher on average (M = 36.37, SD = 9.29) than friend social support for physical activity (M = 30.58, SD = 8.36), but neither were very high when compared to the maximum possible score of 60, indicating that the average participant reported receiving social support for physical activity only a few times a month. The family social support for physical activity subscale had good reliability for this sample (α = .867). The friend social support for physical activity subscale also had good reliability for this sample (α = .863). See Table 6.

Correlations Among Variables of Interest

The significant correlations of the independent variables with physical activity are (in order of highest r-value) family social support for physical activity (r = .401, p < .001), friend support for physical activity (r = .279, p = .002), and body image (r = .189, p = .038). BMI was highly correlated with body image (r = .557, p < .001). Physical activity enjoyment was positively related to acculturation (r = .201, p = .029), family social support (r = .247, p = .007) and friend social support (r = .200, p = .028) and negatively related to thin-ideal internalization (r = -.182, p = .045) and pressures to be thin (r = -.185, p = .042). Friend social support was positively related to appearance-related media messages (r = .253, p = .005). See Table 7.

Table 6

Description of Variables of Interest

Variable	n	Mean	S.D.	No. of items	Cronbach's α
Physical Activity	123	69.789	46.01	1	n/a
Pubertal stage	121	12.76	4.181	6	.614
PA enjoyment	121	64.884	12.798	16	.688
Acculturation	121	40.361	10.119	11	.894
Body Image	121	1.669	3.634	2	.604
Total Social Support	121	66.049	15.548	24	.644
Family SS subscale	121	36.373	9.287	12	.867
Friend SS subscale	121	30.579	8.364	12	.863
Total Media Influence	121	77.091	22.255	30	.858
Thin Ideal	121	23.545	8.257	9	.644
Pressures	121	17.876	7.367	7	.737
Appearance	121	23.909	7.004	9	.606

Note. SS denotes social support.

Regression Analysis

The results of the regression analysis will be presented in order, according to the research questions. Using box-and-whisker plots, I identified and eliminated extreme outliers (≥ 3 SD) from four variables: family social support for physical activity, physical activity enjoyment, acculturation, and appearance-related media messages. I eliminated no more than two outliers from each variable. I normalized the variable physical activity (total time spent doing physical activity, in minutes) using square root transformation. I chose square root transformation because the distribution was moderately kurtosed

(Tabachnik & Fidell, 2007). I normalized the variable BMI by recoding any BMI less than 45th percentile as 45. I did this because the focus of this study was on girls with normal weight, overweight, or obesity, not on underweight adolescent girls. With these two variables normalized, assumptions were sufficiently met for regression analysis.

Research Questions and Hypotheses.

I will present the findings from five research questions and eight hypotheses, which are the focus of this study, according to their order in the Revised Physical Activity Lifestyle Model.

Personal Characteristics

RQ1. How do personal characteristics (age, pubertal stage, BMI and ethnicity) influence physical activity in adolescent girls?

H1. Physical activity will be negatively associated with pubertal stage (as defined by Tanner) and age amongst adolescent girls-- e.g. older and more physically mature participants will be less physically active.

The overall model for pubertal stage and age on physical activity was not significant [$F(2, 117) = .100$, $p = .905$], and accounted for only 0.2% of the variance in physical activity. Neither pubertal stage ($B = -.036$, $SE = .093$, $t = -.384$, $p = .702$) nor age ($B = -.011$, $SE = .375$, $t = .028$, $p = .978$) were a statistically significant predictor of physical activity. The first hypothesis was not supported.

H2. Controlling for age, BMI, and pubertal stage, Hispanic adolescent girls will have lower physical activity than White girls.

This hypothesis was not tested because there were not enough White girls ($n = 12$) to conduct the statistical test to compare White and Hispanic girls ($n = 106$)

Table 7

Correlations Amongst Variables in a Model of Physical Activity in Adolescent Girls

	Phys. Activity	Pubertal Stage	Age	BMI %	Body Image	Acculturation	PA enjoyment	Friend SS	Family SS	Thin Ideal	Appearance	Pressures
Phys. Activity	1											
Pubertal Stage	0.041	1										
Age	-0.121	.456**	1									
BMI %	.009	.005	.029	1								
Body Image	.189*	.097	.072	.557**	1							
Acculturation	.091	.151	.152	.073	-.095	1						
PA Enjoyment	.161	-.063	-.104	.103	-.016	.201*	1					
Friend SS	.279**	.060	.108	.021	.059	.109	.200*	1				
Family SS	.401**	.046	-.051	.108	.159	.114	.247**	.401**	1			
Thin Ideal	-.032	.089	-.054	.062	.052	-.075	-.182*	.097	-.011	1		
Appearance	.067	.005	-.095	-.102	-.137	.006	-.111	.253**	.010	.630**	1	
Pressures	.016	.043	-.001	.153	.148	-.110	-.185*	.130	.032	.822**	.546**	1

*$p < .05$, **$p < .01$

Perceptual Influences

RQ2. How do perceptual influences (physical activity enjoyment and body image) impact physical activity in adolescent girls?

H3. Physical activity enjoyment and body image will be positively associated with physical activity.

The overall model for physical activity enjoyment and body image on physical activity was statistically significant [$F(2, 118) = 3.932$, $p = .022$], and accounted for 6.2% of the variance in physical activity. While body image was a statistically significant predictor of physical activity ($B = .197$, $SE = .092$, $t = 2.147$, $p = .034$), physical activity enjoyment was not ($B = .048$, $SE = .026$, $t = 1.837$, $p = .069$). The findings provided partial support for the third hypothesis.

H4. Physical activity enjoyment will be negatively associated with BMI.

The overall model for physical activity enjoyment on BMI was statistically significant [$F(1, 109) = 4.056$, $p = .046$] and accounted for 3.6% of the variance in physical activity. Contrary to the hypothesis, however, physical activity enjoyment had a statistically significant positive association with BMI ($B = .425$, $SE = .211$, $t = 2.014$, $p = .046$). The findings did not support the fourth hypothesis.

Interpersonal Influences

RQ3. How do interpersonal influences (family and friends) impact physical activity in Hispanic and White adolescent females?

H5. Support for physical activity by family and friends will be positively associated with physical activity in adolescent girls.

The overall model for family and friend social support for physical activity was statistically significant [$F(2, 114) = 10.417$, $p < .001$] and accounted for 15.5% of the variance in physical activity. Whereas friend social support for physical activity was not a statistically significant predictor of physical activity (B=.062, SE = .041, t = 1.506, p = .135), family social support was a statistically significant positive predictor of physical activity in adolescent girls (B = .132, SE = .038, t = 3.417, p = .001). The findings provided partial support for the fifth hypothesis.

Sociocultural Influences

RQ4. How do sociocultural influences (culture, society and media) impact physical activity in adolescent girls?

H6. Thin ideal internalization, perceived pressures to be thin, and appearance-related media messages will be negatively related to physical activity.

The overall model for thin ideal internalization, perceived pressures to be thin, and appearance-related media messages on physical activity was not statistically significant [$F(3, 115) = .653$, $p = .541$], and accounted for only 1.7% of the variance in physical activity. Individually, thin ideal internalization (B = -.106, SE = .080, t = -1.321, p = .956), pressures to be thin (B = .072, SE = .085, t = .848, p = .174), and appearance-related media messages (B = .057, SE = .066, t = .852, p = .176) were not statistically significant predictors of physical activity. The sixth hypothesis was not supported.

H7. Acculturation will moderate the relationship between appearance-related media messages and physical activity.

Testing for a moderator relationship was performed according to Bennett's (2000) recommendations. Regression analysis was conducted in a two-step hierarchical process.

In step 1, acculturation and appearance-related media messages were entered together as independent variables, with physical activity as the dependent variable. In step 2, the interaction term (the product of appearance-related media messages and acculturation) was entered as an independent variable. Step 1 (acculturation and appearance-related media messages) was not statistically significant [$F(1, 117) = .980, p = .324$], and accounted for only .8% of the variance in physical activity. Step 2 (acculturation and the interaction term) was not statistically significant [$F(2, 116) = .593., p = .588$], and accounted for only .9% of the variance in physical activity. A non-significant Step 1 and 2, coupled with the very low R-squared tells us that acculturation does not moderate the relationship between physical activity and appearance-related media messages. Individually, neither acculturation ($B = .047, SE = .053, t = .581, p = .562$) nor appearance-related media messages ($B = .047, SE = .036, t = 1.277, p = .204$) were statistically significant predictors of physical activity. The fact that neither variable is a significant predictor verifies the null hypothesis that no moderating relationship exists. The seventh hypothesis was not supported. See Tables 8-10.

Table 8

Model Summary of Hypothesis 7: Testing Moderation Effects of Acculturation on Physical Activity

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.091[a]	.008	.000	3.74913
2	.095[b]	.009	-.008	3.76374

Table 9

Analysis of Variance (ANOVA) of Hypothesis 7: Testing Moderation Effects of Acculturation on Physical Activity

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.770	1	13.770	.980	.324
	Residual	1644.550	117	14.056		
	Total	1658.320	118			
2	Regression	15.095	2	7.548	.533	.588
	Residual	1643.224	116	14.166		
	Total	1658.320	118			

Table 10

Regression Coefficients of Hypothesis 7: Testing Moderation Effects of Acculturation on Physical Activity

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	6.222	1.419		4.385	.000
	total acculturation	.034	.034	.091	.990	.324
2	(Constant)	6.196	1.427		4.342	.000
	total acculturation	.026	.043	.069	.592	.555
	interac	.000	.000	.036	.306	.760

H8. Acculturation will be negatively associated with higher body image in adolescent girls.

Acculturation was not a statistically significant negative predictor of body image (B = .06, SE = .219, t = .274, p = .784). Additionally, the overall regression model was not statistically significant F(1, 108) = .075, p = .784 and quite weak (R^2 = .001). There was

no significant correlation between acculturation and body image (r = -.089, p = .336). The eighth hypothesis was not supported.

Overall Model

RQ5. How do personal characteristics, perceptual influences, interpersonal influences, and sociocultural influences combine to affect physical activity?

Overall, the model was statistically significant $F(11, 90) = 3.135$, $p = .001$, and explained 27.7% of the variance in physical activity. Significant predictors included BMI percentile (B = -.043, SE = .019, t = -2.249, p = .027), appearance-related media messages (B = .259, SE = .127, t = 2.038, p = .044), pressures to be thin (B = .311, SE = .149, t = 2.082, p = .040), family social support for physical activity (B = .089, SE = .042, t = 2.139, p = .035), body image (B = .367, SE = .123, t = 2.987, p = .004), and physical activity enjoyment (B = .083, SE = .040, t = 2.089, p = .040). Non-significant predictors included acculturation (B = .026, SE = .037, t = .690, p = .492), friend social support for physical activity (B = .064, SE = .046, t = 1.390, p = .168), thin-ideal internalization (B = .254, SE = .145, t = 1.744, p = .085) and pubertal stage (B = -.081, SE = .083, t = -.986, p = .327). See Tables 11-13.

Table 11

Model Summary of Research Question 5: The Overall Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.526	.277	.189	3.35139

Table 12

Analysis of Variance (ANOVA) of Research Question 5: The Overall Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	387.330	11	35.212	3.135	.001
	Residual	1010.862	90	11.232		
	Total	1398.192	101			

Table 13

Multiple Linear Regression Model of Research Question 5: The Overall Model

		Unstandardized Coefficients			
Model		B	Std. Error	*t*	Sig.
1	(Constant)	.137	3.379	.040	.968
	total acculturation	.026	.037	.690	.492
	normalized BMI% where values <40 = 40	-.043	.019	-2.249	.027
	SATAQ subscale: appearance-related media messages	.259	.127	2.038	.044
	SATAQ subscale: pressures to be thin	.311	.149	2.082	.040
	SATAQ subscale: thin-deal internalization	.254	.145	1.744	.085
	family social support for exercise	.089	.042	2.139	.035
	friend social support for exercise	.064	.046	1.390	.168
	body image (cdrs_2 - cdrs_1)	.367	.123	2.987	.004
	total PA enjoyment	.083	.040	2.089	.040
	total pubertal stage	-.081	.083	-.986	.327

Summary

Individually, only body image and family social support for physical activity were statistically significant predictors of physical activity. However, when I combined the variables into one model, several variables became statistically significant predictors of physical activity in adolescent girls, namely BMI percentile, appearance-related media messages, pressures to be thin, family social support for physical activity, body image, and physical activity enjoyment. Of the five research questions and eight hypotheses, only one research question was supported by the study results, Research Question 5 (how do personal characteristics, perceptual influences, interpersonal influences, and sociocultural influences combine to affect physical activity). Two hypotheses, Hypothesis 3 (physical activity enjoyment and body image will be positively associated with physical activity) and Hypothesis 5 (support for physical activity by family and friends will be positively associated with physical activity in adolescent girls) were partially supported, since only body image was a significant predictor for Hypothesis 3, and only family social support was a significant predictor for Hypothesis 5.

Chapter 5: Discussion and Conclusions

Introduction

In this chapter, I will summarize and discuss the findings of the PALI Study, and how they compare to current research in the literature. Next, I will discuss the limitations of the study. I will conclude with implications for nursing research, practice, education, policy and recommendations for future research.

Overview of the Study

The purpose of the PALI Study was to examine and compare the influence of personal characteristics, perceptual influences, interpersonal influences and sociocultural influences on physical activity in White and Hispanic adolescent girls. Height, weight and survey data from 121 White, Hispanic and mixed race female participants 11-14 years of age were collected at The University of Texas at Austin Children's Wellness Center in Del Valle, Texas in the summer months (June-August) of 2011 and 2012.

Summary of Findings

Individually, only body image and family social support were significant predictors of physical activity. Furthermore, acculturation was not a significant moderator of the relationship between appearance-related media messages and physical activity. However, when all the independent variables were entered into a model simultaneously, BMI percentile, appearance-related media messages, pressures to be thin, family social support for physical activity, body image, and physical activity enjoyment became significant predictors. In total, this complete model explained 27.7% of the variance in physical activity.

Discussion of Findings

The Revised Physical Activity Lifestyle Model (R-PALM).

The R-PALM sought to explain personal, perceptual, interpersonal, and sociocultural factors that contribute to physical activity in adolescent girls. This model was helpful to describe relationships between factors proposed to influence physical activity. However, in the future the R-PALM will need more testing, such as through structural equation modeling, to determine the strength and nature of the relationships among the independent variables (age, ethnicity, BMI, pubertal stage, body image, physical activity enjoyment, family/friend social support for physical activity, media influence, acculturation) and their influence on the dependent variable (physical activity). The fact that there were significant relationships in the overall regression model that did not exist individually suggests that there may be some unexpected mediators in the model. According to the R-PALM (page 8), Perceptual Influences, Interpersonal Influences and Sociocultural Influences may mediate the relationship between Personal Characteristics and Physical Activity. However, there is little to no research on this topic, so I will leave the examination of potential mediator and moderator relationships for future research.

Personal Characteristics

As explained earlier, personal characteristics include age, gender, body mass index (BMI) and pubertal stage. I hypothesized that physical activity would be negatively associated with pubertal stage and age. A multiple regression analysis revealed that neither age nor pubertal stage was a significant predictor of physical activity for female adolescents in the PALI Study. I expected that age and pubertal stage would

influence physical activity, as girls who matured at age 11 were less likely to be physically active at age 13 (Baker, Birch, Trost & Davidson, 2007; Davidson, Werder, Trost, Baker & Birch, 2007). However, in the PALI study, age was not a predictor of physical activity. This finding contrasts with the findings of those previous studies. Perhaps the lack of association between age and physical activity was due to the fact that physical activity was only measured at one time point or due to the sample demographics; mean age at menarche for this sample was 11.13 years, meaning that the majority of participants were early maturing girls, similar to the sample described in Baker et al. (2007).

There has been little research on this topic but researchers in a recent German study reported a significant positive association between age and physical activity in 6,813 girls and boys aged 11-17, but no significant association between puberty and physical activity in girls, except for those who reported irregular menstruation (Finne, Buksch, Lampert & Kolip, 2011).

I also hypothesized that Hispanic girls would have lower physical activity levels than White girls. Unfortunately, I was unable to test the second hypothesis due to an insufficient sample of White girls. This was due to the fact that I found fewer White girls than I had expected at The University of Texas at Austin Children's Wellness Center, given the area's demographics. There was no difference in recruitment difficulty between Hispanic and White adolescents.

Perceptual Influences

Defined as thoughts and feelings related to physical activity, perceptual influences include physical activity enjoyment and body image. In the PALI Study, body image

(difference between self-rated current and ideal body size) was a significant predictor of physical activity, but physical activity enjoyment was not. The finding of Burgess, Grogan and Burwitz (2006) supports body image as a positive predictor of physical activity in middle school aged adolescent girls. Physical activity enjoyment was also supported as a predictor of physical activity (Hohepa, Schofield & Kolt, 2006). The findings in the literature related to physical activity enjoyment contrast with the findings of the PALI Study, as physical activity enjoyment was not a significant predictor of physical activity in the PALI Study. The findings in the literature related to body image may be supported, but the literature is scant in this area, and Burgess, Grogan and Burwitz (2006) used a different scale to measure body image (The Body Attitudes Questionnaire) than the one used in the PALI Study.

Contrary to what was expected, in the PALI Study physical activity enjoyment had a significant positive association with BMI. This means that the more overweight a participant was, the more likely she was to enjoy physical activity. This is in contrast to what was reported by previous researchers—that more overweight adolescents reported less physical activity enjoyment (Deforche, De Bourdeaudhuij & Tanghe, 2006; Fairclough & Stratton, 2006). However, Cannioto (2010), in a study of 174 adult women (33-63 years of age) in western New York, found a statistically significant positive correlation between physical activity enjoyment and BMI ($r_s = 434$, $p = .003$), and a significant negative correlation between BMI and physical activity ($r_s = -.306$, $p = .027$). Because the PALI Study also found a positive correlation between BMI and physical activity enjoyment, among adolescents rather than adults, —this may be a phenomenon worth examining further.

Interpersonal Influences

Interpersonal influences are the impact of family members and friends on adolescent girls' choice to participate in physical activity. Interpersonal influences include family social support for physical activity and friend social support for physical activity. In the PALI Study, family social support for physical activity was a significant predictor of physical activity, but friend social support was not. This is unexpected because the literature supports both types of social support as predictors of physical activity (Kahn, Huang, Gillman, Field, Austin, Colditz & Frazier, 2008; Sabiston & Crocker, 2008). Sabiston and Crocker (2008), in a study of 396 Canadian girls grades 10-12, found that family and peer social support were significantly associated with physical activity frequency, intensity and duration. Kahn et al. (2008) found that parental social support (particularly maternal social support) was a significant predictor of physical activity. Although the specific source of family social support was not measured in the PALI Study, it would be interesting to measure it in future research. Additionally, it is possible that friend social support was not a significant predictor in this population because younger adolescents may spend more time at home than with friends, particularly if they are caring for younger siblings. However, Gesell, Tesdahl, and Ruchman (2012), in a study of 81 United States grade school children 5-12 years of age, found that children consistently adjusted their physical activity levels to emulate their peers ($OR = 6.89$, $p < .01$), and that obesity status had no significant effect on this trend ($OR = .66$, $p = 0.1$). Friend social support in Gesell et al. was measured using interviews to determine the child's social network within the study participants—e.g. children at an after-school program, then actigraphy was used to determine level of physical activity of

the participant and his or her friends (Gesell, et al.). In contrast, friend support in the PALI Study was measured using a quantitative survey instrument, where participants were asked to recall how many times in the past month their friends had supported physical activity. Adolescent perception of friend support may differ from actual friend support and role-modeling. Perhaps a mixed methods approach to measure friend support such as that used by Gesell, Tesdahl & Ruchmanet al. would yield different results.

Sociocultural Influences

Media messages, cultural messages and social messages are all included in the category of sociocultural influences that affect an adolescent girl's choice to participate in physical activity. Acculturation, thin-ideal internalization, perceived pressures to be thin, and appearance-related media messages are all the measurable dimensions of sociocultural influences. Acculturation was not a significant predictor of physical activity. The lack of significant association between acculturation and physical activity could be due to the fact the participants in the PALI Study were all highly acculturated. If the study were replicated in sample with more variation in acculturation, perhaps there would be significant associations between acculturation and physical activity.

In the PALI Study, neither thin ideal internalization, perceived pressures to be thin, nor appearance-related media messages were significant predictors of physical activity. Van den Berg and Neumark-Sztainer (2007) found that middle school girls who reported they often read dieting advice from beauty magazines were twice as likely to engage in unhealthy weight control behaviors, and three times as likely develop an eating disorder in high school. Taveras et al. (2004) found that wanting to look like figures in

the media was significantly associated with higher physical activity levels among 11,606 United States boys and girls 9-16 years of age. This contrasts with the results of the PALI study, as neither thin ideal internalization, perceived pressures to be thin, appearance-related media messages, nor acculturation alone were significant predictors of physical activity.

Overall Model

Finally, I tested the contribution of all of the independent variables on the dependent variable (physical activity). This overall model predicted 27.7% of the variance in physical activity. Interestingly, several variables that were not significant predictors of physical activity individually became significant predictors when entered into the overall model—e.g. BMI, appearance-related media messages, pressures to be thin, physical activity enjoyment. It is possible that these variables mediate other relationships in the Physical Activity Lifestyle Model, which is why they are significant predictors in an overall model, but not individually (Bennett, 2000). Schneider and Cooper (2011) found that physical activity enjoyment moderated the impact of their physical activity intervention for adolescent girls ($N = 122$). Whereas physical activity enjoyment did not independently predict physical activity, it was a significant predictor in the overall model. It may be that physical activity enjoyment in the PALI Study was a moderator or mediator of physical activity.

Limitations

There are several limitations to the PALI Study. First, the sample size was at the edge of adequate (post-hoc analysis computed power at .79), the sample was ethnically homogenous, and the participants were a convenience sample, all recruited at one

location. Therefore, the PALI Study has limited generalizability. Second, physical activity in this sample was self-reported, a method of physical activity measurement that may be less accurate than pedometry or actigraphy. Furthermore, physical activity was measured using duration in minutes, not METs, and as a result I was unable to measure intensity of physical activity (i.e. light, moderate, vigorous). Third, some of the participants ($n \sim 5$) reported difficulty reading the survey, requiring their parents or myself to read the questions for them, which may have limited the honesty of their responses. This may have had something to do with the fact that half of the scales had questionable reliability in this sample (α =.699 - .600). Fourth, it is worth mentioning that translation of the survey into Spanish was attempted, but that surveys that were available in Spanish had significant differences in number and content of questions from the English to the Spanish versions. Furthermore, validated Spanish versions were difficult to obtain, and translation was quite costly, so the sample was limited to English-speakers. Fifth, all data was collected over two summers during the hottest time of the year in Texas, June through August, where average temperatures range from 95-105 degrees. Therefore, participants may be less active during the summer than during the cooler times of the year, preferring to stay indoors in the air conditioning.

Conclusion

Interpersonal influences, perceptual influences and sociocultural influences all influence physical activity in Central Texas Hispanic girls. Personal characteristics do not appear to influence physical activity in this population.

This study raises additional questions. Why were there significant results in the complete model, but not individually? There may have been moderator/mediator relationships between one or more of the independent variables on physical activity. If one examines the beta values in the overall regression model it seems that body image, pressures to be thin, and appearance-related media messages are the most important predictors, but that does not match the literature. Despite evidence from the literature, acculturation was not a moderator. Why was BMI positively associated with physical activity enjoyment? Was this simply a fluke, or is there a phenomenon worth studying here? Interestingly, family social support for physical activity was a stronger predictor of physical activity than peer social support for physical activity. This is unusual, as most research in this area puts peers as stronger predictors of physical activity—perhaps this is a cultural phenomenon?

Recommendations for Future Research.

In future research, I will use structural equation modeling to examine relationships and interrelationships in the Revised Physical Activity Lifestyle Model, and to determine why certain variables are only significant predictors of physical activity when entered simultaneously into the overall multiple linear regression model. Another idea for future research would be to conduct a qualitative or mixed-methods study to do a more in-depth examination of the effect of media influence on adolescent girls. I believe

that the measures available to examine media influence are too complex for middle school-aged girls, particularly those who might have a lower than average reading level. In the future, I could conduct a qualitative study, using focus groups and individual interviews to develop a more age-appropriate instrument that is relevant to Hispanic adolescent girls. Family and friend social support measurements were also somewhat general, and a more thorough examination of how specific family members (e.g. mother, father, siblings, cousins, aunts, uncles, grandparents) influence physical activity may provide insight into the specific contribution of family members to social support for physical activity, and why it is more important than friend support in this population. Additionally, the concept of peer bullying and harassment was not measured and it may contribute to physical activity in this population. In the future, using an objective measure of physical activity, such as actigraphy, pedometry, or doubly-labeled water (a solution in which the hydrogen and oxygen have been partly or completely replaced in order to track metabolic expenditure) may help to provide a more objective and accurate measure of physical activity.

Using the results of the PALI Study, there are a few preliminary recommendations for future physical activity promotion interventions. First, physical activity interventions should involve family members, and encourage family participation in physical activity. In Hispanic girls, family social support for physical activity may be more important than friend social support for physical activity.

Implications for Nursing Practice.

When planning physical activity interventions, nurses should consider that there may be factors influencing physical activity that are not easily modifiable by an

individually-based intervention—e.g. body image, physical activity enjoyment, family social support for physical activity, and media influence. Involving family members in physical activity interventions, and encouraging family physical activity may be helpful to increase physical activity in adolescent girls. It is also important to discuss thin-ideal internalization, media messages, and how they influence perception of ideal body size with adolescent girls and their family members. It is important to emphasize genetic differences in body shape and size, and help girls learn to accept a natural, healthy body size, because this population is at risk for unhealthy dieting and excessive exercise behavior.

Implications for Nursing Education.

In the university setting, it is important to teach nursing students, at the novice and advanced practice levels, to be aware of the multitude of factors that influence physical activity when designing physical activity interventions. Students need to be aware of the multitude of factors—personal, perceptual, interpersonal and sociocultural—that influence physical activity. It is a combination of these factors, rather than one factor alone, that influence physical activity. This material would be ideal to be taught on the bachelor's level as part of a S2-level community/public health course. It would also be ideal for community/public health on a graduate level, as well as a health promotion course (e.g. Health Without Illness). On a bachelors or graduate level, the material should be taught in a classroom, then applied on a practical level by having the students plan and/or implement a school-based educational or policy intervention (e.g. girl-friendly P.E. class, plan to increase athletic participation for girls, plan to increase girls' sports offerings at the local Boys and Girls Club, etc.).

Implications for Policy.

The results of the PALI study also have implications for policy. Regulation of thin-ideal messages in the media may help reduce thin-ideal internalization, and the deleterious effects of appearance-related media messages. For instance, the government of Israel recently banned the use of models from fashion shows and advertising campaigns if their BMI is below 18.5 (Smith, 2013). Additionally, increased funding for government physical activity promotion campaigns and physical education in schools can help increase physical activity in adolescent girls.

There is a need to re-design physical education programs for girls—co-ed physical education may not be appropriate for middle school and high school aged girls, and competitive activities may discourage lower-performing adolescent girls. Non-competitive, female-only physical education classes may help increase physical activity enjoyment for adolescent girls.

Del Valle High School offers 9 sports for boys (baseball, basketball, cross country, football, golf, powerlifting, soccer, tennis and track) and 9 sports for girls (softball, basketball, cross country, volleyball, golf, powerlifting, soccer, tennis and track). Sports participation opportunities for Del Valle middle school girls are somewhat limited, as these schools (Del Valle Middle School and Ojeda Middle School) do not have an athletic program. The local Del Valle Boys and Girls Club offers several sports opportunities for middle-school-aged girls: flag football, floorball, and soccer, all of which are co-ed (boys and girls). According to the Del Valle Club's director, at present they only have a boy's basketball team, but plan to start a girl's basketball team and a track and field program soon (D. Vasquez, personal communication, April 3, 2013).

Del Valle is not unique in its lack of sports programs for girls. A nationwide survey of over 7,000 U.S. public high schools revealed that regardless of school resources (low income, middle income or high income areas), geographical region (north, south, east, west) or community (urban, rural, small town, or suburban), girls had 25% fewer school athletic participation opportunities than boys (Sabo & Veliz, 2012). Although the gender gap in sports participation initially shrunk from 14% to 11% from 1993-2000, the 11% difference persisted from 2000-2006, widening to 13% in 2010 (Sabo & Veliz). Texas has one of the lowest gender equity ratios in the U.S. (ratio of boys to girls sports programs offered)-- .65, meaning that girls have only a little more than half the athletic opportunities that boys do (Sabo & Veliz). This statistic ranks Texas as 43rd in the nation for gender equity in high school sports. Sabo and Veliz offer several policy recommendations for increasing athletic participation opportunities for girls: 1.) The Office of Civil Rights should increase its enforcement of Title IX, 2.) Federal policymakers should require high schools to release athletic program gender equity data to the public, 3.) Urban schools in particular should make an extra effort to increase the number of athletic participation opportunities available to girls, and 4.) All schools should have Title IX Coordinators that regularly self-evaluate the school to ensure they are complying with the law.

Implications for Public Health.

The Healthy People 2020 goal for physical activity is to "improve health, fitness, and quality of life through daily physical activity (2013)." In order to do this, the U.S. Department of Health and Human Services (DHHS) has made several recommendations (Physical Activity Guidelines, 2012). School recommendations include, 1.) enhanced PE

with increased activity time, delivered by well-trained specialists in an appropriate facility, with an emphasis on moderate to vigorous physical activity, 2.) more frequent recess and classroom physical activity breaks, 3.) development of activity sessions before and after school, and providing after-school activity space and equipment, and 4.) promote active transportation (e.g. walking, bike riding) to and from school. On a community level, recommendations include several environmental suggestions, 1.) increasing walkability and bikeability of communities, 2.) increase the amount of trees along streets, and decrease litter and poorly-maintained or vacant lots, and 3.) increase access and proximity to parks and recreational facilities. The DHHS encouraged the development of physical activity and nutrition education programs at residential summer camps. The DHHS also recommended physical activity promotion through public awareness campaigns, pointing to the success of the VERB^{TM} campaign (Huhman, Potter, Duke, Judkins, Heitzler & Wong, 2007).

Keller, Strohschein, Lia-Hoagberg and Schaffer's public health Intervention Wheel identifies a number of ways that nurses implement these suggested changes on a population or community-wide level (2004a; 2004b). Nurses can launch a public awareness campaign, either through flyers, posters, TV spots, or a presentation at a Parent Teacher Association meeting to raise awareness for the importance of families exercising together to promote physical activity—that telling your daughter to exercise is not enough, you have to show her. Nurses can work together with coaches, PE teachers, parents, superintendents, and even nutrition and physical activity experts to develop a school culture that is friendly toward active adolescent girls, such as encouraging gender-segregated PE, and teaching coaches and teachers how to discourage physical activity-

and obesity-related bullying. Nurses can work with PE teachers, parents, physical activity experts, and even adolescent girls themselves to develop a PE program that is both fun and physically active.

Nurses can raise awareness in the community—for example, the fact that my sample of Del Valle adolescent girls had a much higher rate of obesity than the national average (Ogden et al., 2012). The Del Valle obesity problem may be partially due to the fact that the nearest grocery store is 15 miles away, and there are no sidewalks in this neighborhood, so girls may not feel safe to walk around their community. Nurses can talk to community leaders, local businesses, parents, and teachers about encouraging local convenience stores to stock fresh fruits and vegetables, or making a safe place for adolescent girls to be active, such as an after-school physical activity program.

Nurses can involve parents and girls in a community-wide intervention to educate them in how to overcome external obstacles—where to find safe places to exercise, how to interpret media messages, how to talk to your children about physical activity, how to plan physical activities together with families, how to make time for physical activity, and overcoming common misconceptions and stereotypes about active girls. Nurses can encourage participation in already established physical activity programs, such as the Boys and Girls Club.

Nurses can screen children in school for early signs of diabetes and cardiovascular disease, such as acanthosis nigricans and hypertension, then refer them to clinics, where they will receive further testing and an advanced practice nurse can talk with them and their families about a preventative program, involving healthy diet, physical activity, frequent monitoring, and possibly medications. Nurses can then have the families back

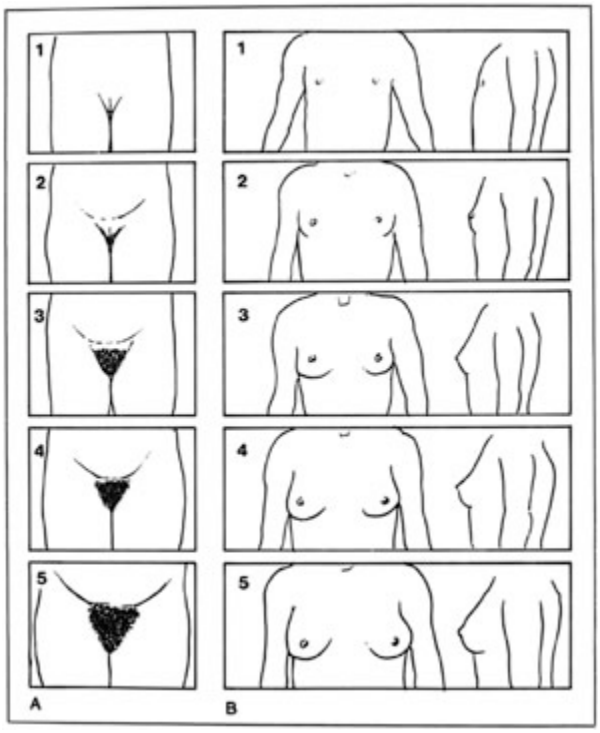
to the clinic in a month to check in on how the program is working, and help them overcome obstacles that have come up.

Summary

In this chapter, I discussed and summarized the results of the Physical Activity Lifestyle Influences Study. I listed limitations of the study, conclusions of the research, and implications for research, education, practice, policy, and public health.

Appendices

Appendix A: Tanner Stages of Physical Maturation, Girls



Appendix B: The Physical Activity Lifestyle Influences Survey

Please write the answers to the questions in the spaces provided below.

1. Please enter the number that is written on the top of your consent form.
If you don't have the ID number, you can skip this question, but please contact the primary investigator to get your ID number.

_____

2. What is your age?
Please put whole numbers only, no fractions or decimals. For example, if you are 12 and a half years old, please just enter 12.

_____

3. What grade are you in?

_____

4 What school do you go to?

_____

What is your race/ethnicity?
Please put an X in the box by only one of the following:

- ☐ White
- ☐ Black
- ☐ Hispanic/Latino
- ☐ Asian
- ☐ Other (please specify) _____

What activities did you do yesterday that made you breathe hard or sweat?

For each time period (before school, during school and after school) please write down the amount of time you did that activity.

For example, if you walked for 20 minutes before school, write 20 in the box under "Before School."

If you rode your bike for 30 minutes after school, write 30 in the box under "After School."

Example:

Activity	Before School	During School	After School
Running, walking, or biking			
Bicycling			30
Walking	20		

You don't have to put something for every activity, and if you didn't do any of these physical activities, that's okay too. If you did an activity that isn't on this list, there will be a space for you to put it in later in the survey.

Please turn to the next page to start the log.

Activity	Before School	During School	After School
Running, walking, or biking	**********	**********	**********
Bicycling			
Walking			
Running			
Mixed walking/running			
Chores	**********	**********	**********
Outdoor chores: mowing, raking, gardening, etc.			
Indoor chores: mopping, vacuuming, sweeping, etc.			
Exercises	**********	**********	**********
Swimming laps			
Exercise: push-ups, sit-ups, jumping jacks, etc.			
Sports	**********	**********	**********
Gymnastics: bars, beams, tumbling, trampoline, etc.			
Basketball			
Baseball/Softball			
Football			
Soccer			
Volleyball			
Martial arts: karate, kickboxing, etc.			
Skateboarding			
Racket sports: badminton, tennis, etc.			
Play	**********	**********	**********
Ball playing: four square, dodge ball, kickball, etc.			
Games: chase, tag, hopscotch, etc.			
Outdoor play: climing trees, hide and seek			
Water play: (swimming pool, ocean, or lake)			

Jump rope			
School Activities	**********	**********	**********
Marching band, flagline, or drill team			
PE class			
ROTC			

Other Activities:
Did you do any activities that made you sweat or breathe hard that are not listed on the last page? If so, put them in the space below, and write how many minutes you did them for.

Example: golf: 45 minutes

Now, please record the amount of time (hours and minutes) that you spent watching TV or movies, or playing video games or computer games. If you spent less than 15 minutes at any of these activities, you don't need to record it. The average kid's T.V. show lasts 30 minutes, so if you watched two T.V. shows, you watched T.V. for 1 hour.

Entertainment	Before School	During School	After School
T.V./Video			
Video Games and Computer Games			

For each statement below, put an X in the bubble next to the response that best represents how much you 'disagree' or 'agree' with the statement.

When I am active…

1. I enjoy it.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

2. I feel bored.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

3. I dislike it.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

4. I find it's fun.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

5. It's not fun at all.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

When I am active…

6. It gives me energy.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

7. It makes me depressed.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

8. It's very pleasant.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

9. My body feels good.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

10. I get something out of it.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

11. It's very exciting.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

When I am active…

12. It frustrates me.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

13. It's not at all interesting.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

14. It gives me a strong feeling of success.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

15. It feels good.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

16. I feel as though I would rather be doing something else.

- ☐ Disagree a lot
- ☐ Disagree a little
- ☐ Neither agree nor disagree
- ☐ Agree a little
- ☐ Agree a lot

The Pubertal Development Scale

The next questions are about changes that may be happening to your body. These changes normally happen to different young people at different ages. Put an X in the box by the response that best applies to you. If you do not understand a question or do not know the answer, put an X in the box by "I don't know."

Would you say that your growth in height:

- ☐ Has not yet begun to spurt
- ☐ Has barely started
- ☐ Is definitely in progress
- ☐ Seems completed
- ☐ I don't know

And how about the growth of your body hair?
("Body hair" means hair any place other than your head, such as under your arms)

Would you say that your body hair growth:

- ☐ Has not yet begun to spurt
- ☐ Has barely started
- ☐ Is definitely in progress
- ☐ Seems completed
- ☐ I don't know

Have you noticed any skin changes, especially pimples?

- ☐ Has not yet begun to spurt
- ☐ Has barely started
- ☐ Is definitely in progress
- ☐ Seems completed
- ☐ I don't know

Have you noticed that your breasts have begun to grow?

- ☐ Has not yet begun to spurt
- ☐ Has barely started
- ☐ Is definitely in progress
- ☐ Seems completed
- ☐ I don't know

Have you started your period?

- ☐ Yes
- ☐ No

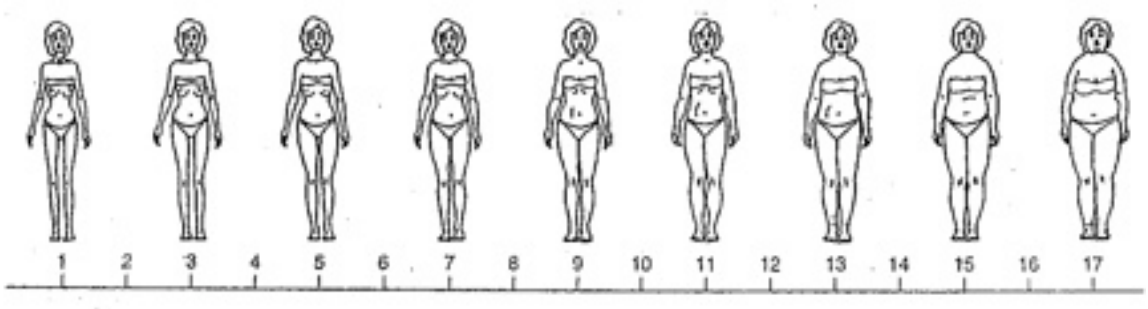
If yes, how old were you when you started your period?

_____

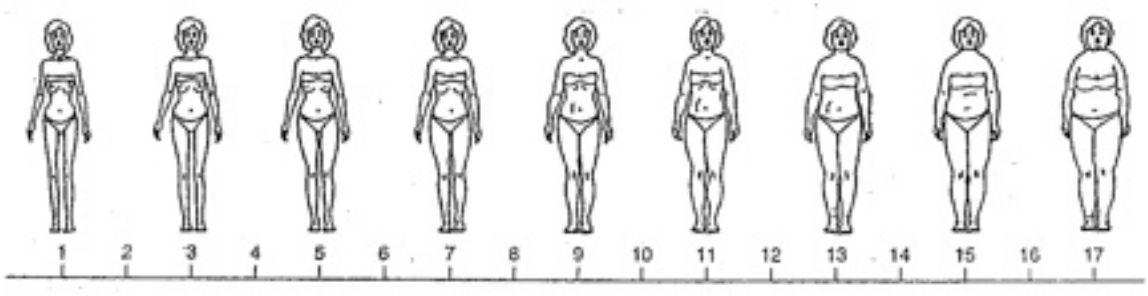
The Contour Drawing Rating Scale

Please circle the number below the figure that represents the size you would like to be. If the figure you would like to be is in between two figures, then circle the number that is in between the two figures.
PLEASE NOTE: The numbers on the line DO NOT refer to dress sizes. They are just the numbers we have assigned to each figure. The numbers that DO NOT have a drawing on top represent "in between" sized figures.

Please circle the size that you would like to be:



Now, please circle the size that you are right now.



Social Support and Exercise Survey

Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question. Put an X in the bubble that best applies to each statement.

During the past three months my friends…

1. Exercised with me.
   - ☐ None
   - ☐ Rarely
   - ☐ A few times
   - ☐ Very often
   - ☐ Does not apply

2. Offered to exercise with me.
   - ☐ None
   - ☐ Rarely
   - ☐ A few times
   - ☐ Very often
   - ☐ Does not apply

3. Gave me helpful reminders to exercise.
   - ☐ None
   - ☐ Rarely
   - ☐ A few times
   - ☐ Very often
   - ☐ Does not apply

4. Gave me encouragement to stick with my exercise program.
   - ☐ None
   - ☐ Rarely
   - ☐ A few times
   - ☐ Very often
   - ☐ Does not apply

5. Discussed exercise with me.
   - ☐ None
   - ☐ Rarely
   - ☐ A few times
   - ☐ Very often
   - ☐ Does not apply

6. Complained about the time I spent exercising.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

7. Criticised or made fun of me for exercising.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

8. Gave me rewards for exercising (bought me something or gave me something I like).
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

9. Planned for exercise on recreational outings.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

10. Helped plan activities around my exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

11. Asked me for ideas on how they could get more exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

12. Talked about how much they like to exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

Now, answer the same questions again, this time for your family.

During the past three months my family…

13. Exercised with me.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

14. Offered to exercise with me.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

15. Gave me helpful reminders to exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

16. Gave me encouragement to stick with my exercise program.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

17. Discussed exercise with me.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

18. Complained about the time I spent exercising.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

19. Criticised or made fun of me for exercising.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

20. Gave me rewards for exercising (bought me something or gave me something I like).
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

21. Planned for exercise on recreational outings.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

22. Helped plan activities around my exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

23. Asked me for ideas on how they could get more exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

24. Talked about how much they like to exercise.
- ☐ None
- ☐ Rarely
- ☐ A few times
- ☐ Very often
- ☐ Does not apply

Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ-3)

Please read each of the following items carefully and mark an X in the box that best represents your opinion.

1. TV programs are an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

2. I've felt pressure from TV or magazines to lose weight.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

3. I do **NOT** care if my body looks like the body of people who are on TV.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

4. I compare my body to the bodies of people who are on TV.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

5. TV commercials are an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

6. I do **NOT** feel pressure from TV or magazines to look pretty.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

7. I would like my body to look like the models that appear in magazines.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

8. I compare my appearance to the appearance of TV and movie stars.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

9. Music videos on TV are **NOT** an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

10. I've felt pressure from TV and magazines to be thin.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

11. I would like my body to look like the people who are in movies.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

12. I do **NOT** compare my body to the bodies of people who appear in magazines.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

13. Magazine articles are **NOT** an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

14. I've felt pressure from TV or magazines to have a perfect body.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

15. I wish I looked like the models in music videos.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

16. I compare my appearance to the appearance of people in magazines.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

17. Magazine advertisements are an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

18. I've felt pressure from TV or magazines to diet.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

19. I do **NOT** wish to look as athletic as the people in magazines.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

20. I compare my body to that of people in "good shape."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

21. Pictures in magazines are an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

22. I've felt pressure from TV or magazines to exercise.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

23. I wish I looked as athletic as sports stars.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

24. I compare my body to that of people who are athletic.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

25. Movies are an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

26. I've felt pressure from TV or magazines to change my appearance.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

27. I do **NOT** try to look like the people on TV.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

28. Movie stars are **NOT** an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

29. Famous people are an important source of information about fashion and "being attractive."

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

30. I try to look like sports athletes.

- ☐ Definitely Disagree
- ☐ Mostly Disagree
- ☐ Neither Agree Nor Disagree
- ☐ Mostly Agree
- ☐ Definitely Agree

31. What TV shows do you watch every day, or nearly every day?

32. What magazines do you read most often?

Short Acculturation Scale for Hispanics-Youth (SASH-Y)
Please put an X in the box answer that best reflects the culture of your family, friends and environment.

1. What language(s) do you read and speak?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

2. What language(s) do your parents speak to you in?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

3. What language(s) do you usually speak at home?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

4. In what language(s) do you usually think?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

5. What language(s) do you usually speak with your friends?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

6. In what languages are the TV programs you usually watch?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

7. In what languages are the radio programs you usually listen to?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

8. In what languages are the movies you prefer to watch?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

9. In what language to your parents speak with their parents?

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

10. Your close friends are:

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

11. You prefer going to parties at which the people are:

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

12. The persons you visit or who visit you are:

- ☐ Only Spanish
- ☐ More Spanish than English
- ☐ Both equally
- ☐ More English than Spanish
- ☐ Only English

Thank you for completing the PALI survey. If you have any questions, concerns, or comments about how this survey can be better, please contact the primary investigator, Anne Standiford Brown: studyinfo@teenhealthsurvey.org (512) 973-9846.

Thank you for completing this survey.

Appendix C: Consent and Assent Forms

Consent Form
The University of Texas at Austin

You are being asked to let your child be in a research study. There will be 122 adolescent girls in this study, all patients of health centers in the Austin area. This form gives you information about the study. The Principal Investigator (the person in charge of this research), Anne Standiford Brown, will give you a copy of this form for your records. She will also describe this study to you and answer all of your questions. Please read the information below. Feel free to ask any questions you might have before deciding whether or not to take part. You and your child's participation is your choice.

Title of Research Study:

The Physical Activity Lifestyle Influences (PALI) Study

Principal Investigator:

Anne Standiford Brown, RN, BSN
Doctoral Candidate at the University of Texas at Austin
8. 973-9846
studyinfo@teenhealthsurvey.org

Faculty Sponsors:

Lynn Rew, EDD, RN, AHN-BC, FAAN
(512) 471-7941
ellerew@mail.utexas.edu

Alexandra Garcia, RN, PhD.
Associate Professor at the University of Texas at Austin
(512) 471-7973
agarcia@mail.nur.utexas.edu

Funding Source: This study is not funded.

The purpose of this study is to:

- Explore how social environment (family, friends, TV, magazines, movies, culture) and personal characteristics (weight, physical activity enjoyment, stage of puberty, age) influence young adolescent girls' physical activity habits.

If you agree to be in this study, we will ask your child to do the following things:

- Have her height and weight measured.
- Write down all her physical activities for one day.
- Answer questions about her body development.
- Estimate her current and ideal body size.

- Answer questions about family, friends, culture and media, and how they influence her physical activity habits.

Total estimated time to participate in study is 45-60 minutes.

Risks of being in the study:
- There are some questions in this survey that may make your child feel uncomfortable. Your child does not have to answer questions she is uncomfortable answering. If you want to talk about this risk or any other risks, ask questions now or contact the researcher later.

Benefits of being in the stu**d**y:
- There are no benefits to participating in this study. However at the end of this study, you may choose to receive a newsletter describing the results of this study.

Costs of being in the study:
- Being in this study is free to you and your child.

Compensation for being in the study:
- Your child will be entered to win an iPod Nano as a reward for finishing the survey.

If you or your child is injured because of this study:
- This study has little or no physical risk. If you or your child suffer emotional pain or anxiety due to being in this study, please call or email the primary investigator, Anne Standiford Brown, (512) 973-9846 or at studyinfo@teenhealthsurvey.org.
- If you need immediate psychiatric help, please call Psychiatric Emergency Services Crisis Hotline, 512-472-HELP (4357).

If you do not want to be in the study:
- Your child's participation in this study is voluntary. You are free to decide not to be in the study. You are also free to take your child out of the study at any time.
- Leaving the study will not change your relationship with The University of Texas at Austin and the participating health centers, now or in the future. The researcher will let you know if she learns anything that might change your decision to be in the study.

How do I quit the study?
- Please call or email the principal investigator, Anne Standiford Brown, (512) 973-9846 or at studyinfo@teenhealthstudy.org.

Confidentiality and Privacy Protection:

- Your child will be weighed and measured in a private area, out of view of others, to protect her privacy. Your child will complete the survey in an area where nobody else can see her responses.

- Study data may be given to other researchers in the future for other research. In these cases, the data will not have your name, address, or any information that could link you or your child to this or any other study.

- The **records** of this study will be stored securely in a locked file in the researchers office and kept private. The primary investigator, her supervising faculty from UT Austin,, the members of the Institutional Review Board, have the legal right to look at your child's

research records. They will protect the c**onfidentiality** of those records as the law permits. Articles or books published about this study will not identify you or your child as a subject.

Contacts and Questions:

- If you have any questions about the study please ask now. If you have questions later, want more information, or want to quit the study, call or email Anne Standiford Brown. Her name, phone number, and e-mail address are on the first page of this consent form.
- If you have questions about your child's rights as a research participant, complaints, concerns, or questions about the r**e**search you can anonymously contact the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

You may keep a copy of this consent form.

You are choosing to let your daughter be in this study. Signing below means that you have read this consent form. It means you will allow her to participate in the study. If you change your mind later, simply tell the primary investigator, Anne Standiford Brown. You may take your daughter out of the study at any time.

_____
Printed Name of Daughter

_____ _____
Signature of Parent(s) or Legal Guardian Date

_____ _____
Signature of Principal Investigator Date

Would you like to see a newsletter summarizing the results of this study? If so, please provide your email address or your physical address.

Name (please print): _____

Email (optional): _____

Mailing Address: _____

City/State/Zip: _____

ASSENT FORM

The PALI Study

I agree to be in a study about things that affect physical activity. This study was explained to my (mother/father/parents/guardian) and (she/he/they) said that I could be in it. The only people who will know about what I say and do in the study will be the people in charge of the study.

In this study, I will:

- Have my height and weight measured
- Answer questions about my physical activity habits
- Answer questions about my body development.
- Estimate my current body size, and the body size I would like to be
- Answer questions about my family, friends, culture and media.

This survey will take about 45-60 minutes to complete.

Writing my name on this page means that the page was read (by me/to me) and that I agree to be in the study. I got permission from my parent(s)/guardian(s) to be in the study, and I agree to be in it. I know that I can quit the study at any time.

_____ _____

Adolescent's Signature Date

_____ _____

Signature of Principal Investigator Date

Appendix D: IRB Approval Form

OFFICE OF RESEARCH SUPPORT

THE UNIVERSITY OF TEXAS AT AUSTIN

P.O. Box 7426, Austin, Texas 78713 - Mail Code A3200
(512) 471-8871 - FAX (512) 471-8873

FWA # 00002030

Date: 04/10/12

PI: Anne Standiford Brown

Dept: Nursing

Title: Examining Biological, Affective, Interpersonal and Sociocultural Influences on Physical Activity in Middle Adolescent Girls: The Physical Activity Lifestyle Influences (PALI) Study

Re: IRB Final Approval for Protocol Number 2010-11-0096

Dear Anne Standiford Brown:

In accordance with the Federal Regulations for review of research studies, the Institutional Review Board (IRB) reviewed the above referenced protocol at a convened meeting on 03/26/2012 and approved the protocol with explicit conditions. Your response to the explicit conditions has been reviewed and found to be satisfactory and your protocol is approved for the following period of time:

Approval for your study is from: 04/25/2012 to 04/24/2013. *Expires 12 a.m. [midnight] of this date.*

☒ Use the attached approved informed consent document(s).

☐ You have been granted a Waiver of Documentation of Consent according to 45 CFR 46.117 and/or 21 CFR 56.109(c)(1).

☐ You have been granted a Waiver of Informed Consent according to 45 CFR 46.116(d).

Responsibilities of the Principal Investigator:

1. Report immediately to the IRB any unanticipated problems.

2. Submit for review and approval by the IRB all modifications to the protocol or consent form(s). Ensure the proposed changes in the approved research are not applied without prior IRB review and approval, except when necessary to eliminate apparent immediate hazards to the subject. Changes in approved research implemented without IRB review and approval initiated to eliminate apparent immediate hazards to the subject must be promptly reported to the IRB, and will be reviewed under the unanticipated problems policy to determine whether the change was consistent with ensuring the subjects continued welfare.

3. Report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to participate.

4. Ensure that only persons formally approved by the IRB enroll subjects.

5. Use only a currently approved consent form, if applicable.
   Note: Approval periods are for 12 months or less.

6. Protect the confidentiality of all persons and personally identifiable data, and train your staff and collaborators on policies and procedures for ensuring the privacy and confidentiality of subjects and their information.

7. Submit a Continuing Review Application for continuing review by the IRB. Federal regulations require IRB review of on-going projects no less than once a year a reminder letter will be sent to you two months before your expiration date. If a reminder is not received from Office of Research Support (ORS) about your upcoming continuing review, it is still the primary responsibility of the Principal Investigator not to conduct research activities on or after the expiration date. The Continuing Review Application must be submitted, reviewed and approved, before the expiration date.

8. Upon completion of the research study, a Closure Report must be submitted to the ORS.

9. Include the IRB study number on all future correspondence relating to this protocol.

If you have any questions contact the ORS by phone at (512) 471-8871 or via e-mail at orsc@uts.cc.utexas.edu.

Sincerely,

James P. Wilson

James Wilson, Ph.D.
Institutional Review Board Chair

Glossary

Adolescence: The developmental period between childhood and adulthood, in which many physical, emotional and social changes take place in the individual's life. For the purpose of this study, "adolescent" will refer to early adolescence-- e.g. children aged 11-14. I chose this stage because I wish to study factors that influence physical activity during puberty, and this is the age at which the majority of adolescent girls go through puberty (Tanner, 1990).

Acculturation: The process of change that occurs when two cultures come into direct contact with each other (Berry, 1992). In this study, acculturation will represent the degree to which adolescent girls in the study identify with dominant United States culture (Serrano, 2003).

Appearance-related media messages: The standards of attractiveness that are conveyed via media representations of women and attractiveness in general (Henderson-King & Brooks, 2009).

Body Image: The subjective perception of, and satisfaction with, the appearance of one's own body (Gerrig & Zimbardo, 2009). High body image refers to an adolescent girl's contentment with the way her body

appears, and low body image refers to an adolescent girl's discontentment with the way her body appears.

Body Mass Index: is a statistical calculation that allows one to compare the proportion of body weight to body height and is equal to the body weight (in kilograms) divided by the squared height (in meters). For children and adolescents, BMI is plotted on the CDC growth charts (separated by sex) to determine the BMI-for-age percentile (Must, Dallal & Dietz, 1991).

Family: Immediate and extended family of the participants—parents, stepparents, siblings, step-siblings, grandparents, cousins, aunts and uncles.

Friends and Peers: Adolescents of the same or similar age group (11-14 years) who associate with the participants on a regular basis. These associations may be in the participants' school, church, or neighborhood.

Hispanic: A group of people who self-identify as being of Latin American descent, primarily from Mexico, but also from Cuba, Puerto Rico, Central or South America (U.S. Census Bureau News, 2012).

Interpersonal Influences: The impact of family members and friends on adolescent girls' choice to participate in physical activity.

Light physical activity: Low-intensity physical activities such as slow walking activities such as grocery shopping, walking to class, slow bike riding, wading in a pool, or any *non-strenuous activity* (DHHS, 2008).

Messages: Verbal or non-verbal expressions that communicate values and opinions on a certain topic, such as ideal physical appearance

Moderate physical activity: Medium-intensity physical activities such as fast walking, bike riding, playing softball, swimming, light yard work or any other *moderately strenuous activity* (DHHS, 2008).

Obese: The physical state of excess body fat accumulation to the extent that the adolescent's health may be negatively affected. Obesity in adolescents is defined as a BMI greater than or equal to the 95th percentile for adolescents of the same age and sex (Must, Dallal & Dietz, 1991).

Overweight: The physical state of having more body fat than is optimally healthy. Overweight in adolescence is defined as a BMI greater than or equal to 85th percentile, and less than the 95th percentile for adolescents of the same age and sex (Must, Dallal & Dietz, 1991).

Perceptual Influences: Thoughts and feelings related to physical activity. This definition includes physical activity enjoyment and body image.

Pressures to be thin: These are comments or actions by others that may serve to encourage adolescent girls to believe they need to conform to thin ideal images portrayed in the media (Thompson & Stice, 2001).

Personal Characteristics: These are facets of biological and personal identity that influence physical activity. This definition includes BMI, pubertal stage, age and gender.

Physical Activity: any form of physical movement that results in an increase in heart rate and respiratory rate. There are many different types of physical activities. Some popular physical activities include walking, running, bicycle riding, calisthenics, aerobic dance and sports (such as basketball, volleyball, football, and soccer). For the purpose of this study, physical activity will be measured in minutes per day, intensity and duration.

Physical Activity Enjoyment: An emotional state that reflects feelings of fun, delight and pleasure when participating in physical activity (Motl et al., 2001).

Physically Active: Participants who report engaging in 1.5-3 hours of moderate-intensity physical activity, or 30-60 minutes of vigorous physical activity during the three-day recall period.

Pubertal Stage: The stage of sexual maturation, as classified by the changes in secondary sexual characteristics (Tanner, 1975). In females, this determination is based on hair growth in axillae and pubis, as well as breast development. According to Tanner, stage I represents pre-puberty, while stage IV represents late puberty, near-adult maturation. (Tanner, 1990).

Puberty: A period of human development in which physical growth and sexual maturation occur (Tanner, 1962).

Sociocultural Influences: The impact of media messages, cultural messages, and social messages on adolescent girls' choice to participate in physical activity.

Thin-ideal internalization: The extent to which adolescent girls believe that the ultra-thin figures presented in the media represent the ideal body figure, and the extent to which they try to approximate this ideal with their

own bodies (Thompson & Stice, 2001). Thin ideal internalization is a facet of media messages, a part of sociocultural influences.

Vigorous physical activity: High-intensity physical activities such as playing basketball, soccer, football, running, stair-climbing, or any other *strenuous activity* (DHHS, 2008).

References

Abrams, L. S., & Stormer, C. C. (2002). Sociocultural variations in the body image perceptions of urban adolescent females. *Journal of Youth and Adolescence, 31,* 443-450.

Ainsworth, B. E., Haskell, W. L., Leon, A. S., Jacobs, D. R., Montoye, H. J., Sallis, J. F. & Paffenbarger, R. S. (1993). Compendium of physical activities: Classification of energy costs of human physical activities. *Medicine and Science in Sports and Exercise, 25,* 71-80.

Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swarz, A. M., Strath, S. J., O'Brien, D. R. . . . Leon, A. S. (2000). Compendium of physical activities: An update of activity codes and MET intensities. *Medicine and Science in Sports and Exercise, 32,* S498-S504.

Alsaker, F. D., & Flammer, A. (2006). Pubertal Maturation. In Jackson, S., & Goosens, L. (Eds.), *Handbook of adolescent development* (pp. 30-50). New York: Psychology Press.

Anderson, S. E., Dallal, G. E., & Must, A. (2003). Relative weight and race influence average age at menarche: Results from two nationally representative surveys of US girls studied 25 years apart. *Pediatrics, 111,* 844-850.

Anderson, S. E. & Must, A. (2005). Interpreting the continued decline in the average age at menarche: Results from two nationally representative surveys of U.S. girls studied 10 years apart. *Journal of Pediatrics, 147,* 753-760.

Austin, J. L., & Smith, J. E. (2008). Thin ideal internalization in Mexican girls: A test of the sociocultural model of eating disorders. *International Journal of Eating Disorders, 41,* 448-457.

Ayala, G. X., Mickens, L., Galindo, P., & Elder, J. P. (2007). Acculturation and body image perception among Latino youth. *Ethnicity and Health, 12,* 21-41.

Baker, B. L., Birch, L. L., Trost, S. G., & Davidson, K. K. (2007). Advanced pubertal status at age 11 and lower physical activity in adolescent girls. *Journal of Pediatrics, 151,* 488-93.

Bardone-Cone, A. M. & Cass, K. M. (2007). What does viewing a pro-anorexia website do? An experimental examination of website exposure and moderating effects. *International Journal of Eating Disorders, 40,* 537-548.

Barona, A., & Miller, J. A. (1994). Short Acculturation Scale for Hispanic Youth (SASH-Y): A preliminary report. *Hispanic Journal of Behavioral Sciences, 16,* 155-162.

Bauer, K. W., Nelson, M. C., Boutelle, K. N., & Neumark-Sztainer, D. (2008). Parental influences on adolescents' physical activity and sedentary behavior: Longitudinal findings from Project EAT-II. *International Journal of Behavioral Nutrition and Physical Activity, 5.* Retrieved March 11, 2010 from http://www.ijbnpa.org/content/5/1/12

Bauman, A., Bowles, H. R., Huhman, M., Heitzler, C. D., Owen, N., Smith, B. J., & Reger-Nash, B. (2008). Testing a hierarchy-of-effects model: Pathways from awareness to outcomes in the VERB campaign, 2002-2003. *American Journal of Preventive Medicine, 34,* S249-S256.

Bennett, J. A. (2000). Mediator and moderator variables in nursing research: Conceptual and statistical differences. *Research in Nursing and Health, 23,* 415-420.

Berensen, G. S., Srinivasan, S. R., Weihang, B., Newman, W. P., Tracy, R. E., & Wattigney, W. (1998). Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. *New England Journal of Medicine, 338,* 1650-1656.

Berry, J. (1992). Acculturation and adaptation in a new society. *International Migration*, *30*, 69-85.

Best Places to Live in Del Valle (2010) Retrieved April 29, 2010 from http://www.bestplaces.net/city/Del%20Valle-Texas.aspx

Bibbins-Domingo, K., Coxson, P., Pletcher, M. J., Lightwood, J. & Goldman, L. (2007). Adolescent overweight and future adult coronary heart disease. *New England Journal of Medicine, 357,* 2371-2379.

Brodersen, N. H., Steptoe, A., Boniface, D. R., & Wardle, J. (2007). Trends in physical activity and sedentary behaviour in adolescence: Ethnic and socioeconomic differences. *British Journal of Sports Medicine, 41,* 140-144.

Brown, A. S. (2009). Promoting physical activity amongst adolescent girls. *Issues in Comprehensive Pediatric Nursing, 32,* 49-64.

Brown, D. R., Galuska, D. A., Zhang, J., Eaton, D. K., Fulton, J. E., Lowry, R., & Maynard, L. M. (2007). Physical activity, sport participation, and suicidal behavior: U.S. high school students. *Medicine and Science in Sports and Exercise, 39,* 2248-2257.

Brown, K. M., McMahon, R. P., Biro, F. M., Crawford, P., Schreiber, G. B., Similo, S. L., . . . Striegel-Moore, R. (1998). Changes in self-esteem in black and white girls between the ages of 9 and 14 years. *Journal of Adolescent Health, 27,* 7-19.

Burns, N., & Grove, S. K. (1999). *Understanding nursing research* (2nd ed.). Philadelphia: W.B. Saunders.

Burgess, G., Grogan, S., & Burwitz, L. (2006). Effects of a 6-week aerobic dance intervention on body image and physical self-perceptions in adolescent girls. *Body Image, 3,* 57-66.

Butte, N. F., Cai, G., Cole, S. A., Wilson, T. A., Fisher, J. O., Zakeri, I. F., . . . Comuzzie, A. G. (2007). Metabolic and behavioral predictors of weight gain in Hispanic children: the Viva la Familia Study. *American Journal of Clinical Nutrition, 85,* 1478-1485.

Cannioto, R. A. (2010). Beliefs of overweight and obese working women: A preliminary analysis. *Women in Sport and Physical Activity Journal, 19,* 70-85.

Carskadon, M. A., & Acebo, C. (1993). A self-administered rating scale for pubertal development. *Journal of Adolescent Health, 14,* 190-195.

Caspersen, C. J., Pereira, M. A., & Curran, K. M. (2000). Changes in physical activity patterns in the United States, by sex and cross-sectional age. *Medicine & Science in Sports & Exercise, 32,* 1601-1609.

Castelli, W. P. (1984). Epidemiology of coronary heart disease: The Framingham Study. *American Journal of Medicine, 76,* 4-12.

Castillo, E. H., Borges, G., Talaver, J. O., Orozco, R., Vargas-Alemàn, B. A., Huitròn-Bravo, G., . . . Salmeron, J. (2007). Body mass index and the prevalence of metabolic syndrome among children and adolescents in two Mexican populations. *Journal of Adolescent Health, 40,* 521-526.

Centers for Disease Control (2012). Youth Risk Behavior Surveillance—United States, 2011: Physical Activity. *MMWR 61,* 35-37.

Chen, A., Chung, E., DeFranco, E. A., Pinney, S. M., & Dietrich, K. M. (2011). Serum PBDEs and age at menarche in adolescent girls: analysis of the National Nutrition Examination Survey 2003-2004. *Environmental Research, 111,* 831-837.

Clark, L. & Tiggemann, M. (2008). Sociocultural and individual psychological predictors of body image in young girls: A prospective study. *Developmental Psychology, 44,* 1124-1134.

Clay, D., Vignoles, V. L., & Dittmar, H. (2005). Body image and self-esteem among adolescent girls: Testing the influence of sociocultural factors. *Journal of Research on Adolescence, 15,* 451-477.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155-159.

Crespo, C. J., & Arbesman, J. (2003). Obesity in the United States. *Physician and Sportsmedicine, 31*. Retrieved February 15, 2005 from http://www.lib.utexas.edu/journals/

Colberg, S. R., Sigal, R. J., Fernhall, B., Regensteiner, J. G., Blissmer, B. J., Rubin, R. R., . . . Braun, B. (2010). Exercise and type 2 diabetes: The American College of Sports Medicine and the American Diabetes Association: Joint position statement. *Diabetes Care, 33,* e147-e167.

Crossman, A., Sullivan, D. A., & Benin, M. (2006). The family environment and American adolescents' risk of obesity as young adults. *Social Science and Medicine, 63,* 2255-2267.

Currie, C., Ahluwalia, N., Godeau, E., Gabhainn, S. N., Due, P., & Currie, D. B. (2012). Is obesity at an individual and national level associated with lower age at menarche? Evidence from 34 countries in the Health Behavior in School-aged Children Study. *Journal of Adolescent Health, 50,* 621-626.

Davidson, K. K., Werder, J. L., Trost, S. G., Baker, B. L., & Birch, L. L. (2007). Why are early maturing girls less active? Links between pubertal development, psychological well-being, and physical activity among girls at ages 11-13. *Social Science and Medicine, 64,* 2391-2404.

Daviglus, M. L., Talavera, G. A., Avilès-Santa, M. L., Allison, M., Cai, J., Criqui, M. H. . . . Stamler, J. (2012). Prevalence of major cardiovascular risk factors and cardiovascular diseases among Hispanic/Latino individuals of diverse backgrounds in the United States. *JAMA, 308,* 1775-1784.

Deardorff, J., Berry-Millett, R., Rehkopf, D., Luecke, E., Lahiff, M., & Adams, B. (2012). Maternal pre-pregnancy BMI, gestational weight gain, and age at menarche in daughters. *Maternal Child Health Journal, 6.* Retrieved July 18, 2013 from http://link.springer.com/article/10.1007/s10995-012-1139-z

Deforche, B., De Bourdeaudhuij, I., Tanghe, A., Hills, A. P., & De Bode, P. (2004). Changes in physical activity and psychosocial determinants of physical activity in children and adolescents treated for obesity. *Patient Education and Counseling: 55,* 407-415.

Department of Health and Human Services (2008). Physical activity guidelines for Americans. Retrieved November 3, 2008 from http://www.health.gov/PAguidelines/guidelines/default.aspx

Diaz, H. (2007). Influence of acculturation and gender on diet and exercise behavior examined with the theory of planned behavior in Latino adolescents. *Dissertation Abstracts International,* 69 (11), B. (UMI No. 3310735).

Diaz, V. A., Mainous, A. G., & Pope, C. (2007). Cultural conflicts in the weight loss experience of overweight latinos. *International Journal of Obesity, 31,* 328-333.

Dishman, R. K., Dunn, A., Sallis, J. F., Vandenberg, R. J., & Pratt, C. A. (2010). Social cognitive correlates of physical activity in a multi-ethnic cohort of middle-school girls: Two-year prospective study. *Journal of Pediatric Psychology, 35,* 188-198.

Dishman, R. K., Hales, D. P., Sallis, J. F., Saunders, R., Dunn, A. L., Bedimo-Rung, A. L., & Ring, K. B. (2010). Validity of social-cognitive measures for physical activity in middle-school girls. *Journal of Pediatric Psychology, 35,* 72-88.

Dohnt, H. K., & Tiggemann, M. (2006). Body image concerns in young girls: The role of peers and media prior to adolescence. *Journal of Youth and Adolescence, 35,* 141-151.

Dumith, S. C., Gigante, D. P., Domingues, M. R., & Kohl, H. W. (2011). Physical activity change during adolescence: A systematic review and a pooled analysis. *International Journal of Epidemiology, 40,* 685-698.

Duncan, S. C., Duncan, T. E., Strycker, L. A., & Chaumeton, N. R. (2007). A cohort-sequential latent growth model of physical activity from ages 12-17 years. A*nnals of Behavioral Medicine, 33,* 80-89.

Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatric and Adolescent Medicine, 157,* 733-738.

Eisenmann, J. C., Wickel, E. E., Welk, G. J., & Blair, S. N. (2004). Relationship between adolescent fitness and fatness and cardiovascular disease risk factors in adulthood: The Aerobics Center Longitudinal Study (ACLS). *American Heart Journal, 149,* 46-53.

Engeland, A., Bjorge, T., Sogaard, A., & Tverdal, A. (2003). Body mass index in adolescence in relation to total mortality: 32-year follow-up of 227,000 Norwegian boys an girls. *American Journal of Epidemiology, 157,* 517-523.

Evans, D. W., Necheles, J., Longjohn, M., & Christoffel, K. K. (2007). The 5-4-3-2-1 Go! Intervention: Social marketing strategies for nutrition. *Journal of Nutrition Education and Behavior, 39,* S55-S59.

Fairclough, S., & Stratton, G. (2006). Physical activity, fitness and affective responses of normal-weight and overweight adolescents during physical education. *Pediatric Exercise Science, 17,* 53-63.

Finne, E., Buksch, J., Lampert, T., & Kolip, P. (2011). Age, puberty, body dissatisfaction, and physical activity decline in adolescents. Results of the German health Interview and Examination Survey (KiGGS). *International Journal of Behavioral Nutrition and Physical Activity, 8,* 119-133.

Flegal, K. M., Carroll, M. D., Kit, B. K., & Ogden, C. L. (2012) Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. JAMA, 307, 491-497.

Forrest, K. Y. Z., & Leeds, M. J. (2007). Prevalence and associated factors of overweight among Mexican-American adolescents. *Journal of the American Dietetic Association, 107,* 1797-1780.

Forshee, R. A., Anderson, P. A., & Storey, M. L. (2004). The role of beverage consumption, physical activity, sedentary behavior and demographics on body mass index of adolescents. *International Journal of Food Sciences and Nutrition, 55,* 463-478.

Franko, D. L., Jenkins, A., Roehrig, J., Luce, K. H., Crother, J. H., & Rodgers, R. F. (2012). Psychometric properties of measures of eating disorder risk in Latina college women. *International Journal of Eating Disorders, 45,* 592-596.

Fulkerson, J. A., Strauss, J., Neumark-Sztainer, D., Story, M., & Boutelle, K. (2007). Correlates of psychosocial well-being among overweight adolescents: The role of family. *Journal of Consulting and Clinical Psychology, 75,* 181-186.

Gatsonis, C., & Sampson, A. R. (1989), Multiple correlation: Exact power and sample size calculations. *Psychological Bulletin, 106,* 516-524.

Gavin, J., Rodham, K., & Poyer, H. (2008). The presentation of "pro-anorexia" in online group interactions. *Qualitative Health Research, 18,* 325-333.

Ge, X., Elder, G., Regnerus, M., & Cox, C. (2001). Pubertal transition, perceptions of being overweight, and adolescents' psychological maladjustment: Gender and ethnic differences. *Social Psychology Quarterly, 64,* 363-375.

Gehrman, C. A., Hovell, M. F., Sallis, J. F., & Keating, K. (2006). The effects of a physical activity and nutrition intervention on body dissatisfaction, drive for thinness, and weight concerns in pre-adolescents. *Body Image, 3,* 345-351.

Gerrig, R. J., & Zimbardo, P. G. (2009). *Psychology and life (19th ed.).* Upper Saddle River, NJ: Allyn & Bacon.

Gessell, S. B., Tesdahl, E., & Ruchman, E. (2012). Distribution of physical activity in an after-school friendship network. *Pediatrics, 129,* 1064-1071.

Glessner, M. M., Hoover, J. H., & Hazlett, L. A. (2006). Portrayal of overweight in adolescent fiction. *Reclaiming Children and Youth, 15,* 116-123.

Goran, M. I., Ball, D. C., & Cruz, M. L. (2003). Obesity and risk of type 2 diabetes and cardiovascular disease in children and adolescents. *Journal of Clinical Endocrinology and Metabolism, 88,* 1417-1427.

Gonzalez, G. (2007). Body image and adolescent girls: An examination of salience, satisfaction and influences for Mexican Americans and whites. Dissertation Abstracts International, 68(5), A. (UMI No. 3288158)

Goodman, E., Hinden, B. R., & Khandelwal, S. (2000). Accuracy of teen and parental reports of obesity and body mass index. *Pediatrics, 106,* 52-58.

Greenleaf, C., Chambliss, H., Rhea, D. J., Martin, S. B., & Morrow, J. R. (2006). Weight stereotypes and hehavioral intentions toward thin and fat peers among white and Hispanic adolescents. *Journal of Adolescent Health, 39,* 546-552.

Harrison, K., & Hefner, V. (2006). Media exposure, current and future body ideals, and disordered eating among preadolescent girls: A longitudinal panel study. *Journal of Youth and Adolescence, 35,* 153-163.

He, C., Zhang, C., Hunter, D. J., Hankinson, S. E., Louis, G. M. B., Hediger, M. L., & Hu, F. B. (2009). Age at menarche and risk of type 2 diabetes: Results from 2 large prospective cohort studies. *American Journal of Epidemiology, 171,* 334-344.

Healthy People 2020 (2013). Physical Activity. Retrieved July 22, 2013 from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=33

Huh, D., Stice, E., Shaw, H., & Boutelle, K. (2012). Female overweight and obesity in adolescence: Developmental trends and ethnic differences in prevalence, incidence and remission. *Journal of Youth and Adolescence, 41,* 76-85.

Henderson-King, D., Brooks, K.D. (2009). Materialism, Sociocultural appearance messages, and paternal attitudes predict college women's attitudes about cosmetic surgery. *Psychology of Women Quarterly, 33,* 133-142.

Hoelscher, D. M., Day, D., Lee, E. S., Frankowski, R. F., Kelder, S. H., Ward, J. L., & Scheurer, M.E. (2004). Measuring the prevalence of overweight in Texas schoolchildren. *American Journal of Public Health, 94,* 1002-1008.

Hohepa, M., Schofield, G., & Kolt, G. S. (2006). Physical activity: What do high school students think? *Journal of Adolescent Health, 39,* 328-336.

Hudson, C. E. (2008). An integrative review of obesity prevention in African American children. *Issues in Comprehensive Pediatric Nursing, 31,* 147-170.

Huhman, M., Berkowitz, J. M., Wong, F. L., Prosper, M., Prince, D., & Yuen, J. (2008). The VERB campaign's strategy for reaching African-American, Hispanic, Asian and American Indian children and parents. *American Journal of Preventive Medicine, 34,* S194-S209.

Huhman, M., Potter, L. D., Wong, F. L., Banspach, S. W., Duke, J. C., & Heitzler, C.D. (2005). Effects of a mass media campaign to increase physical activity among children: Year-1 results of the VERB campaign. *Pediatrics, 116,* e277-e284. International Engineering Task Force (n.d.).

Huhman, M., Potter, L. D., Duke, J. C., Judkins, D. R., Heitzler, C. D. & Wong, F. L. (2007). Evaluation of a national physical activity intervention for children: VERB^{TM} campaign, 2002-2004. American Journal of Preventive Medicine, 32, 38-45.

Ianotti, R. J., Kogan, M. D., Janssen, I., & Boyce, W. F. (2009). Patterns of adolescent physical activity, screen-based media use, and positive and negative health indicators in the U.S. and Canada. *Journal of Adolescent Health, 2009,* 493-499.

Imperatore, G., Boyle, J. P., Thompson, T. J., Case, D., Dabelea, D., Hamman, R. F. . . . Standiford, D. (2012). Projections of type 1 and type 2 diabetes buren in the U.S. population aged < 20 years through 2050. *Diabetes Care, 35,* 2515-2520.

Jackson, D. Mannix, J., Faga, P., & McDonald, G. (2004). Overweight and obese children: Mothers' strategies. *Journal of Advanced Nursing 52,* 6-13.

Jerstad, S. J., Boutelle, K. N., Ness, K. K., & Stice, E. (2010). Prospective reciprocal relations between physical activity and depression in female adolescents. *Journal of Consulting and Clinical Psychology, 78,* 268-272.

Jones, D. C., & Crawford, J. K. (2006). The peer appearance culture during adolescence: Gender and body mass variations. *Journal of Youth and Adolescence, 35,* 257-269.

Kahn, J. A., Huang, B., Gillman, M. W., Field, A. E., Austin, B., Colditz, G. A., & Frazier, A. L. (2008). Patterns and determinants of physical activity in U.S. adolescents. *Journal of Adolescent Health, 42,* 369-377.

Keery, H., Boutelle, K., van den Berg, P., & Thompson, J. K. (2006). The impact of appearance-related teasing by family members. *Journal of Adolescent Health, 37,* 120-127.

Keller, L. O., Strohschein, S., Schaffer, M. A., & Lia-Hoagberg, B. (2004a). Population-based public health interventions: Innovations in practice, teaching and management, Part II. *Public Health Nursing, 21,* 469-487.

Keller, L. O., Strohschein, S., Schaffer, M. A., & Lia-Hoagberg, B. (2004b). Population-based public health interventions: Practice-based and evidence-supported, Part 1. *Public Health Nursing, 21,* 453-468.

Kershaw, K. N., Greenlund, K. J., Stamler, J., Shay, C. M., & Daviglus, M. L. (2012). Understanding ethnic and nativity-related differences in low cardiovascular risk status among Mexican-Americans and non-Hispanic Whites. *Preventive Medicine, 55,* 597-602.

Kendzierski, D., & DeCarlo, K. J. (1991). Physical activity enjoyment scale: Two validation studies. *Journal of Sport & Exercise Psychology, 13,* 50-64.

Kirk, S., Zeller, M., Claytor, R., Santangelo, M., Khoury, P. R., & Daniels, S. R. (2005). The relationship of health outcomes to improvement in BMI in children and adolescents. *Obesity Research, 13,* 876-882.

Klaczynski, P. A., Goold, K. W., & Mudry, J. J. (2004). Culture, obesity stereotypes, self-esteem, and the "thin ideal": A social identity perspective. *Journal of Youth and Adolescence, 33,* 307-317.

Knauss, C., Paxton, S. J., & Alsaker, F. D. (2009). Validation of the German version of the sociocultural attitudes toward appearance questionnaire (SATAQ-G). *Body Image, 6,* 113-120.

Kretschmer, B. D., Schelling, P., Beier, N., Liebscher, C., Treutel, S., Kruger, N., . . . Haus, A. (2004). Modulatory role of food, feeding regime, and physical exercise on body weight and insulin resistance. *Life Sciences, 76,* 1553-1573.

Kriska, A. M., Saremi, A., Hanson, R. L., Bennett, P. H., Kobes, S., Williams, D. E., & Knowler, W. C. (2003). Physical activity, obesity, and the incidence of type 2 diabetes in a high-risk population. *American Journal of Epidemiology, 158,* 669-675.

Kulie, T., Slattengren, A., Redmer, J., Counts, H., Eglash, A. & Schrager, S. (2011). Obesity and women's health: An evidence-based review. *Journal of the American Board of Family Medicine, 24,* 75-85.

Latner, J. D., Rosewall, J. K., & Simmonds, M. B. (2007). Childhood obesity stigma: Association with television, video game and magazine exposure. *Body Image, 4,* 147-155.

Lawman, H. G., Wilson, D. K., Van Horn, M. L., Resnicow, K., & Kitzman-Ulrich, H. (2011). The relationship between psychosocial correlates and physical activity in underserved adolescent boys and girls in the ACT Trial. *Journal of Physical Activity and Health, 8,* 253-261.

Lee, D.-C., Argero, E. G., Sui, X., & Blair, S. N. (2010). Review: Mortality trends in the general population: The importance of cardiorespiratory fitness. Journal of *Psychopharmacology, 24, suppl. 4,* 27-35.

Lipczynska, S. (2007). Discovering the cult of Ana and Mia: A review of pro-anorexia websites. *Journal of Mental Health, 16,* 545-548.

Lloyd-Jones, D., Adams, R. J., Brown, T. M., Carnethon, M., Dai, S., De Simone, G. . . . Wylie-Rosett, J. (2010). Hearth disease and stroke statistics–2010 Update: A report from the American Heart Association. *Circulation, 121,* e46-e215.

Lowry, R., Lee, S. M., Fulton, J. E., Demissie, Z., & Kann, L. (2013). Obesity and other correlates of physical activity and sedentary behaviors among US high school students. Journal of Obesity. Retrieved July 17, 2013 from http://www.hindawi.com/journals/jobes/2013/276318/abs/

Lowry, R., Lee, S. M., Fulton, J. E., & Kann, L. (2009). Healthy People 2010 objectives for physical activity, physical education, and television viewing among adolescents: National trends from the Youth Risk Behavior Surveillance System 1999-2007. *Journal of Physical Activity and Health, 6,* S36-S35.

Maligie, M., Crume, T., Scherzinger, A., Stamm, E., & Dabelea, D. (2012). Adiposity, fat patterning, and the metabolic syndrome among diverse youth: The EPOCH Study. *Journal of Pediatrics, 161,* 875-880.

Marshall, S. J., Biddle, S. J. H., Gorely, T., Cameron, N., & Murdey, I. (2004). Relationships between media use, body fatness and physical activity in children and youth: A meta-analysis. *International Journal of Obesity, 28,* 1238-1246.

Maternal Child Health Bureau, (n.d.). Definition of Adolescence. Retrieved November 3, 2008 from http://mchb.hrsa.gov

Matsunaga, M., Hecht, M. L., Elek, E., & Ndiaye, K. (2010). Ethnic identity development and acculturation: A longitudinal analysis of Mexican-heritage youth in the Southwest United States. *Journal of Cross-Cultural Psychology, 41,* 410-427.

McCabe, M. P., Ricciardelli, L. A., & Holt, K. (2010). Are there different sociocultural influences on body image and body change strategies for overweight adolescent boys and girls? *Eating Behaviors, 11*, 156-163.

McMurray, R. G., Ring, K. B., Treuth, M. S., Welk, G. J., Pate, R. R., Schmitz, K. H., Pickrel, J. L. . . . Sallis, J. F. (2004). Comparison of two approaches to structured physical activity surveys for adolescents. *Medicine and Science in Sports and Exercise, 36,* 2135-2143.

Meeus, W., van de Schoot, R., Keijsers, L., Schwarts, S. J., & Branje, S. (2010). On the progression and stability of adolescent identity formation: A five-wave longitudinal study in early-to-middle and middle-to-late adolescence. *Child Development, 81,* 1565-1581.

Mendelson, B. K., Mendelson, M. J., & White, D. R. (2001). Body-Esteem Scale for adolescents and adults. *Journal of Personality Assessment, 76,* 90-106.

Mitchell, J. A., Pate, R. R., Beets, M. W., & Nader, P. R. (2013). Time spent in sedentary behavior and changes in childhood BMI: A longitudinal study from ages 9-15 years. *International Journal of Obesity, 37,* 54-60.

Monge-Rojas, R., Nuñez, H. P., Garita, C., & Chen-Mok, M. (2002). Psychosocial aspects of Costa Rican adolescents' eating and physical activity patterns, *Journal of Adolescent Health, 31,* 212-219.

Moran, A., Jacobs, D.R., Steinberger, J., Hong, C-P., Prineas, R., Luepker, R., & Sinaiko, A. R. (1999). Insulin resistance during puberty: Results from clamp studies in 357 children. *Diabetes, 48,* 2039-2044

Morris, N., & Udry, J. (1980). Validation of a self-administered instrument to assess stage of adolescent development. *Journal of Youth and Adolescence, 9,* 271-280.

Morrison, J. A., Glueck, C. J., Horn, P. S., & Wang, P. (2010). Childhood predictors of adult type 2 diabetes at 9- and 26- year follow-ups. *Archives of Pediatric and Adolescent Medicine, 164,* 53-60.

Morrissey, S. L., Whetstone, L. M., Cummings, D. M., & Owen, L. J. (2006). Comparison of self-reported and measured height and weight in eighth-grade students. *Journal of School Health, 76,* 512-515.

Motl, R. W., Dishman, R. K., Saunders, R., Dowda, M., Felton, G., & Pate, R. R. (2001). Measuring enjoyment of physical activity in adolescent girls. American Journal of Preventive Medicine, 21, 110-117.

Must, A., Dallal, G. E., & Dietz, W. H. (1991). Reference data for obesity: 85th and 95th percentiles of body mass index (wt/ht^2) and triceps skinfold thickness. *American Journal of Clinical Nutrition, 53,* 839-846.

Nelson, M. C., Gordon-Larsen, P. Adair, L. S., & Popkin, B. M. (2005). Adolescent physical activity and sedentary behavior: Patterning and long-term maintenance. *American Journal of Preventive Medicine,* 28, 259-266.

Neumark-Sztainer, D., Gordon, C., Storey, M., & Wall, M. (2004). Associations between body satisfaction and physical activity in adolescents: Implications for programs aimed at preventing a broad spectrum of weight-related disorders. *Eating Disorders, 12,* 125-137.

Newman, P. R., & Newman, B. M. (1997). *Childhood and adolescence.* Boston: Brooks/Cole Publishing.

O'Dea, J. A. (2006). Self-concept, self-esteem and body weight in adolescent females. *Journal of Health Psychology, 11,* 599-611.

O'Dea, J. A. (2003). Why do kids eat healthful food? Perceived benefits of and barriers to healthful eating and physical activity among children and adolescents. *Journal of the American Dietetic Association, 103,* 497-501.

Ogden, C. L., Carrol, M. D., Kit, B. K., & Flegal, K. M. (2012). Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010.

Park, M. H., Falconer, C., Viner, R. M., & Kinra, S. (2012). The impact of childhood obesity on morbidity and mortality in adulthood: A systematic review. *Obesity Reviews, 13,* 985-1000.

Pate, R. R., Dowda, M., O'Neill, J. M., & Ward, D. (2007). Change in physical activity among adolescent girls from 8th to 12th grade. *Journal of Physical Activity and Health, 4,* 3-16.

Patrick, K., Norman, G. J., Calfas, K. J., Sallis, J.F., Zabinski, M. F., Rupp, J., & Cella, J. (2004). Diet, physical activity, and sedentary behaviors as risk factors for overweight in adolescence. *Archives of Pediatric and Adolescent Medicine, 158,* 385-390.

Pender, N. J., Murdaugh, C. L., & Parsons, M. A. (2006). *Health promotion in nursing practice (5th ed.).* Upper Saddle River, NJ: Prentice Hall.

Pepper, A. C. & Ruiz, S. Y. (2007). Acculturation's influence on antifat attitudes, body image and eating behaviors. *Eating Disorders, 15,* 427-447.

Petersen, A. C., Crockett, L., Richards, M., & Boxer, A. (1988). A self-report measure of pubertal status: Reliability, validity and initial norms. *Journal of Youth and Adolescence, 17,* 117-133.

Peterson, M., Abraham, A., & Waterfield, A. (2005). Marketing physical activity: Lessons learned from a campaign to statewide media campaign. *Health Promotion Practice, 6,* 437-446.

Phinney, J. S. & Rosenthal, D. A. (1992). Ethnic identity in adolescence: Process, context and outcome. In G. R. Adams, T. P. Gullotta, R. Montemayor (Eds.) *Adolescent identity formation* (pp. 145-172). Newbury Park, CA: Sage.

Physical activity guidelines for Americans midcourse report subcommittee of the president's council on fitness, sports & nutrition. (2012). *Physical activity guidelines for Americans midcourse report: Strategies to increase physical activity among youth.* Washington, DC: U.S. Department of Health and Human Services.

Pipher, M. (2005). *Reviving Ophelia: Saving the selves of adolescent girls.* New York: Penguin.

Prochaska, J. J., Rogers, M. W., & Sallis, J. F. (2002). Association of parent and peer support with adolescent physical activity. *Research Quarterly for Exercise and Sport, 73,* 206-210.

Rayner, K. E., Schniering, C. A., Rapee, R. M., Taylor, A., & Hutchison, D. M. (2013). Adolescent girls' friendship networks, body dissatisfaction, and disordered eating: Examining selection and socialization processes. *Journal of Abnormal Psychology, 122,* 93-104.

Rendall, M. S., Weden, M. M., Fernandes, M., & Vaynman, I. (2012). Hispanic and black US children's paths to high obesity prevalence. *Pediatric Obesity, 7,* 423-435.

Rew, L. (2005). *Adolescent Health: A multidisciplinary approach to theory, research and intervention.* Thousand Oaks, CA: Sage.

Ribeiro, J., Santos, P., Duarte, J., & Mota, J. (2006). Association between overweight and early sexual maturation in Portuguese boy and girls. *Annals of Human Biology, 33,* 55-63.

Robbins, L. B., Gretebeck, K. A., Kazanis, A. S., & Pender, N. J. (2006). Girls on the move program to increase physical activity participation. *Nursing Research, 55,* 206-216.

Rosenfeld, R. L., Lipton, R. B., & Drum, M. L. (2009). Thelarche, pubarche, and menarche attainment in children with normal and elevated body mass index. *Pediatrics, 123,* 84-88.

Sabiston, C. M., & Crocker, P. R. E. (2008). Examining an integrative model of physical activity and healthy eating self-perceptions and behaviors among adolescents. *Journal of Adolescent Health, 42,* 64-72.

Sabo, D. & Veliz, P. (2012). The decade of decline: Gender equity in high school sports. Ann Arbor, MI: SHARP Center for Women and Girls.

Sallis, J. F., Grossman, R. M., Pinski, R. B., Patterson, T. L., & Nader, P. R. (1987). Development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine, 16*, 825-836.

Sallis, J. F., Strikmiller, P. K., Harsha, D. W., Feldman, H. A., Ehlinger, S., Stone, E. J., . . . Woods, S. (1996). Validation of interviewer- and self-administered physical

activity checklists for fifth grade students. *Medicine and Science in Sports and Exercise, 28,* 840-851.

Saygin, O., Zorba, E., Karacabey, K., & Mengutay, S. (2007). Gender and maturation differences in health-related physical fitness and physical activity in Turkish children. *Pakistan Journal of Biological Sciences, 10,* 1963-1969.

Serrano, E. & Anderson, J. (2003). Assessment of a refined short acculturation scale for Latino preteens in rural Colorado. *Hispanic Journal of Behavioral Sciences, 25,* 240-252.

Schneider, M. & Cooper, D. (2011). Enjoyment of school-based exercise moderates the impact of school-based physical activity intervention. *International Journal of Behavioral Nutrition, 8,* 64-72.

Schubert, C. M., Chumlea, W. C., Kulin, H. E., Lee, P. A., Himes, J. H., & Sun, S. S. (2005). Concordant and discordant sexual maturation among U.S. children in relation to body weight and BMI. *Journal of Adolescent Health, 37,* 356-362.

Sharp, T. A., Grunwald, G. K., Kristen, E. K., Giltinan, P. A.-C., King, D. L., Jatkauskas, B. A., & Hill, J. O. (2003). Association of anthropometric measures with risk of diabetes in Hispanic and Caucasian adolescents. *Preventive Medicine, 37,* 611-616.

Shay, C. M., Ning, H., Daniels, S. R., Rooks, C. R., Gidding, S. S., & Lloyd-Jones, D. M. (2013). Status of cardiovascular health in US adolescents: Prevalence estimates from the National Health and Nutrition Examination Surveys (NHANES) 2005-2010. *Circulation, 127,* 1369-1376.

Shirtcliff, E. A., Dahl, R. E. & Pollack, S. D. Pubertal development: Correspondence between hormonal and physical development. *Child Development, 80,* 327-337.

Singh, G. K., Kogan, M. D., & Yu, S. M. (2009). Disparities in Obesity and overweight prevalence among US immigrant children and adolescents by generational status. *Journal of Community Health, 34,* 271-281.

Smith, R. A. (2013, January, 1). Israel's new year's resolution: No more overly thin models. *The Wall Street Journal.* Retrieved from http://online.wsj.com/article/SB10001424127887323320404578216003751446488.html

Smolak, L., Levine, M. P., & Thompson, J. K. (2001). The use of the sociocultural attitudes towards appearance questionnaire with middle school boys and girls. *International Journal of Eating Disorders, 29,* 216-223.

Spear, B. A. (2002). Adolescent growth and development. *Journal of the American Dietetic Association, 102 Suppl.,* S23- S29.

Springer, A. E., Hoelscher, D. M., Castrucci, B., Peres, A., & Kelder, S. H. (2009). Prevalence of physical activity and sedentary behaviors by metropolitan status in 4th, 8th, and 11th-grade students in Texas, 2004-2005. *Preventing Chronic Disease, 6,* 1-16.

STOPP-T2D Prevention Study Group. (2006). Presence of diabetes risk factors in a large U.S. eighth-grade cohort. *Diabetes Care, 29,* 212-217.

Staessen, J.A., Nawrot, T., Hond, E.D., Lutgarde, T., Fagard, R. Hoppenbrouwers, K., . . . Roels, H. A. (2001). Renal function, cytogenic measurements, and sexual development in adolescents in relation to environmental pollutants: a feasibility study of biomarkers. *Lancet, 357*, 1660-1669.

Strauss, R.S., & Pollack, H.A. (2003). Social marginalization of overweight children. *Archives of Pediatric and Adolescent Medicine, 157,* 746-752.

Strohle, A., Hofler, M., Pfister, H., Muller, A-G., Hoyer, J., Wittchen, H-U., & Lieb, R. (2007). Physical activity and prevalence and incidence of mental disorders in adolescents and young adults. *Psychological Medicine, 37,* 1657-1666.

Sun, S.S., Schubert, C.M., Liang, R., Roche, A.F., Kulin, H.E., Lee, P.A., et al. (2005). Is sexual maturity earlier among US children? *Journal of Adolescent Health, 37,* 345-355.

Sun, S.S., Schubert, C.M., Chumlea, W.C., Roche, A.F., Kulin, H.E., Lee, P.A., . . . Chumplea, W. C. (2002). National estimates of the timing of sexual maturation and racial differences among US children. *Pediatrics, 110,* 911-919.

Sweeting, H., Wright, C., & Minnis, H. (2005). Psychosocial correlates of adolescent obesity, 'slimming down' and 'becoming obese.' *Journal of Adolescent Health, 37,* 409.e9-409.317

Tabachnik, B.G. & Fidell, L.S. (2007). Cleaning up your act: Screening data prior to analysis. In Using multivariate statistics (5th edition). Boston, MA: Pearson Education, Inc.

Tanner, J. M. (1990) F*oetus Into Man, 2nd ed.* Cambridge, Mass.: Harvard University Press.

Tanner, J. M. (1975). Growth and endocrinology of the adolescent. In L. Gardner (Ed.) *Endocrine and Diseases of Childhood,* (2nd ed.). (14-64). Philadelphia: W.B. Saunders.

Tanner, J. M. (1962). *Growth at Adolescence*, (2nd ed.). London: Blackwell.

Taveras, E. M. (2004). The influence of wanting to look like media figures on adolescent physical activity. *Journal of Adolescent Health, 35,* 41-50.

Taylor, C. B., Bryson, S., Doyle, A. A. C., Luce, K. H., Cunning, D., Abascal, L. B., . . . Wilfley, D.E. (2006). The adverse effect of negative comments about weight and shape from family and siblings on women at high risk for eating disorders. *Pediatrics, 118,* 731-738.

Texas Tribune (2012). Public Schools Explorer: Del Valle ISD. Retrieved May 10, 2013 from http://www.texastribune.org/public-ed/explore/del-valle-isd/

Thompson, J. K., Shroff, H., Herbozo, S., Cafri, G., Rodriguez, J. & Rodriguez, B. A. (2007). Relations among multiple peer influences, body dissatisfaction, eating disturbance, and self-esteem: A comparison of average weight, at risk of overweight, and overweight adolescent girls. *Journal of Pediatric Psychology, 32,* 24-29.

Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body image disturbance and eating pathology. *Current Directions in Psychological Science, 10,* 181-183.

Thompson, J. K., van den Berg, P., Roehrig, M., Guarda, A. S., & Heinberg, L. J. (2004). Sociocultural attitudes toward appearance questionnaire (SATAQ-3): Development and validation. *International Journal of Eating Disorders 35,* 293-304.

Thorp, A. A., Owen, N., Neuhaus, M. & Dunstan, D. W. (2011). Sedentary behaviors and subsequent health outcomes in adults: A systematic review of longitudinal studies, 1996-2011. *American Journal of Preventive Medicine, 41*, 207-215.

Tirosh, A., Shai, I., Afek, A., Dubnov-Raz, G., Ayalon, N., Gordon, B. . . . Rudich, A. (2011). Adolescent BMI trajectory and risk of diabetes versus coronary disease. *New England Journal of Medicine, 364,* 1315-1325.

Treuth, M. S., Hou, N., Young, D. R., & Maynard, L. M. (2004). Accelerometry-measured activity or sedentary time and overweight in rural boys and girls. *Obesity Research, 13,* 1606-1614.

Twisk, J. W. R., Kemper, H. C. G., & van Mechelen, W. (2002). The relationship between physical fitness and physical activity during adolescence and cardiovascular disease risk factors at adult age: The Amsterdam Growth and Health Longitudinal Study. *International Journal of Sports Medicine, 23,* S8-S14.

United States Census Bureau (2013). State and county quick facts: Texas. Retrieved July 19, 2013 from http://quickfacts.census.gov/qfd/states/48/48453.html

United States Census Bureau News. (2012). Most children younger than age 1 are minorities, census bureau reports. Retrieved July 19, 2013 from http://www.census.gov/newsroom/releases/archives/population/cb12-90.html

United States National Center for Health Statistics (2010). National Vital Statistics Reports. *Deaths: Final data for 2007, 58.* Retrieved July 19, 2013 from http://www.census.gov/compendia/statab/2012/tables/12s0118.pdf

Urbina, E. M., Gao, Z., Khoury, P. R., Martin, L. J., & Dolan, L. M. (2012). Insulin resistance and arterial stiffness in healthy adolescents and young adults. *Diabetologia, 55,* 625-631.

Ussher, M. H., Owen, C. G., Cook, D. G., & Whincup, P. H. (2007). The relationship between physical activity, sedentary behavior and psychological wellbeing among adolescents. *Social Psychiatry and Psychiatric Epidemiology, 42,* 851-856.

van den Berg, P., & Neumark-Sztainer, D. (2007). Fat 'n happy 5 years later: Is it bad for overweight girls to like their bodies? *Journal of Adolescent Health, 41,* 415-417.

van Dam, R. M., Willett, W. C., Manson, J. E., & Hu, F. B. (2006). The relationship between overweight in adolescence and premature death in women. *Annals of Internal Medicine, 145*, 91-7.

Vartanian, L. R., & Shaprow, J. G. (2008). Effects of weight stigma on exercise motivation and behavior: A preliminary investigation among college-aged females. *Journal of Health Psychology, 13,* 131-138.

Wake, M., Canterford, L., Patton, G., Hesketh, K., Hardy, P., Williams, J., Waters E., & Carlin, J. B. (2010). Comorbidities of overweight/obesity experienced in adolescence: Longitudinal study. *Archive of Disorders in Childhood, 95,* 162-168.

Wang, Y. (2002). Is obesity associated with early sexual maturation? A comparison of the association in American boys versus girls. *Pediatrics, 110,* 903-910.

Wang, J., Iannotti, R. J., & Luk, J. W. (2010). Bullying victimization among underweight and overweight U.S. youth: Differential associations for boys and girls. *Journal of Adolescent Health, 47,* 99-101.

Wertheim, E. H., Paxton, S. J., & Tilgner, L. (2004). Test-retest reliability and construct validity of Contour Drawing Rating Scale scores in a sample of early adolescent girls. *Body Image, 1,* 199-205.

Whitt-Glover, M. C., Wendell, C. T. Floyd, M. F., Yancey, A. K., & Matthews, C. E. (2009). Disparities in physical activity and sedentary behaviors among US children and adolescents: Prevalence, correlates, and intervention implications. *Journal of Public Health Policy, 30,* S309-S334.

Williams, S., & Reid, M. (2007). A grounded theory approach to the phenomena of pro-anorexia. *Addiction Research and Theory, 15,* 141-152.

Wilson, J., Howell, G., & Hinners, M. (2001, October). *Eat Smart. Play Hard. (TM): FNS nutrition education and promotion campaign.* Presented at the 129th annual meeting of the American Public Health Association, Atlanta, Georgia.

Wong, F., Huhman, M., Heitzler, C., Asbury, L., Bretthauer-Muller, R., McCarthy, S., & Londe, P. (2004). VERB-- A social marketing campaign to increase physical activity among youth. Preventing Chronic Disease. Retrieved March 18, 2010, from http://www.cdc.gov/pcd/issues/2004/jul/04_0043.htm

Wu, T., Mendola, P., & Buck, G. M. (2002). Ethnic differences in the presence of secondary sex characteristics and menarche among US girls: The National Health and Nutrition Examination Survey 1988-1994. *Pediatrics, 110,* 752-757.

Wu, T.-Y., & Pender, N. J. (2005). A panel study of physical activity in Taiwanese youth: Testing the Revised Health Promotion Model. *Family and Community Health, 28,* 113-124.

Wu, T.-Y., Pender, N., & Nourredine, S. (2003). Gender differences in psychosocial and cognitive correlates of physical activity among Taiwanese adolescents: A structural equation modeling approach. *International Journal of Behavioral Medicine, 10,* 93-105.

Yuan, A. S. V. (2007). Gender differences in the relationship of puberty with adolescents' depressive symptoms: Do body perceptions matter? *Sex Roles, 57,* 69-80.

Zhang, H. & Rodriguez-Monguio, R. (2012). Racial disparities in the risk of developing obesity-related diseases: A cross-sectional study. *Ethnicity & Disease, 22,* 308-316.

Vita

Anne Standiford graduated from Carlsbad High School in May 1999. Immediately following high school graduation, she spent the summer training as a lay midwife, then moved on to attend New Mexico State University. In July 2003, she was accepted for a summer research internship at The University of Texas at Austin, an experience that would prove pivotal in her future career. In December 2003, she graduated with her B.S. in Nursing. She received her Registered Nurse (R.N.) license in April 2004, and has since practiced nursing in many different specialties, including medical-surgical nursing (various specialties), long-term care, and psychiatric nursing.

In September 2004, she was accepted into The University of Texas at Austin's BSN to PhD program. From 2004-2006, she worked as a graduate research assistant at The University of Texas, assisting in two major nursing research studies, The Women Choosing Wellness Study and The Long HeRBY Study. From 2006-2009, she worked as a teaching assistant and medication assistant at The University of Texas, assisting in the teaching of junior and senior nursing courses, primarily clinicals and simulation laboratories. In 2008, she passed her doctoral qualifying exam, and began work on her dissertation.

From 2008-2009, she worked at Brackenridge Hospital (now University Medical Center at Brackenridge) in the neurology/oncology unit. In 2009, she was privileged to be able to attend a summer study abroad course offered by the School of Nursing, Nursing in Mexico. For 6 weeks, she lived in Guadalajara, Mexico, studying Spanish as well as learning about the Mexican health care system and public health problems that Mexican citizens face. From 2009-2011, she worked at Seton Shoal Creek Hospital in

the inpatient admissions department, and discovered a love of psychiatric nursing. In 2011, she defended her dissertation proposal and began work on data collection.

In 2011, she began work as a teaching assistant and medication assistant for simulation laboratory and clinical at Texas State University St. David's School of Nursing, where she currently works. In the fall of 2012, she concluded data collection and began analysis and writing up the results. That same fall, she was hired as an adjunct lecturer at the St. David's School of nursing, and began teaching classes of her own, Fundamentals of Nursing, Health Assessment and Complex Care. In the Spring of 2013, she taught Psychiatric and Mental Health Care Nursing. She is currently an Associate Professor at Texas State University. Her research interests include adolescent health, providing healthcare to underserved populations, minority health, women's health, and health promotion through primary prevention.

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This dissertation was typed by the author.